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Human risk of avian influenza A(H5N1) associated with exposure to infected dairy cattle and other livestock

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1 Executive summary

1.1 Purpose

This rapid evidence synthesis evaluates the risk of transmission of AIV, specifically A(H5N1), to humans through exposure to infected dairy cattle and other livestock.

1.2 Research questions

- i. What is the risk of transmission to humans associated with exposure to avian influenza A(H5N1) virus associated with infected dairy cattle and other livestock that are hooved animals?
- ii. What is the risk of transmission to other livestock associated with exposure to avian influenza A(H5N1) virus associated with infected dairy cattle?

1.3 Approach

A systematic review following the Cochrane Handbook ¹ was completed and was reported in accordance with the PRISMA reporting guidelines ². A PRESS-reviewed ³ search strategy was used to search published literature databases from 2014 to August 19, 2024, with a final updated search completed on September 12, 2024 (Medline, Embase, CINAHL, CAB Abstracts, Web of Science). A grey literature search was also completed.

Eligibility criteria:

Population:

- Humans: All population groups.
- Non-human animals: dairy cattle and other livestock potentially exposed to dairy cattle associated with the current A(H5N1) outbreak.
 - Hooved livestock included were: cattle, sheep, goats, bison, water buffalo, cervids, swine, donkeys, horses, llamas, and alpacas.
 - Livestock included were: cattle, sheep, goats, bison, water buffalo, cervids, swine, donkeys, poultry, ratites, pigeons, pheasants, partridges, quail, grouse, guinea fowl, pea fowl, horses, rabbits, bees, llamas, alpacas, finfish, mollusks and crustaceans intended for human consumption as food.

Exposure: Avian influenza A(H5N1) virus (irrespective of the clade) from dairy cattle or other hooved animals.

Comparator: No comparator required.

Outcomes:

- Confirmed human infections with avian influenza A(H5N1) virus, from dairy cattle and other hooved livestock.
- Confirmed infections of avian influenza A(H5N1) virus, from dairy cattle to other livestock animals listed above.
- Transmission rates or risk of avian influenza A(H5N1) virus, to humans from dairy cattle and other hooved livestock.
- Transmission rates or risk of avian influenza A(H5N1) virus, from dairy cattle to other livestock animals listed above.

Study design: Any study design including laboratory studies.

Other criteria: Reported in English or French.

Study selection and data extraction: After calibration, abstract and full text review were conducted by two independent reviewers in duplicate. Data were extracted by single reviewers and checked for accuracy by a second reviewer. All disagreements were resolved through discussion and consensus.

Critical appraisal: Due to the study designs (case studies and laboratory-based studies), no critical appraisal was done.

1.4 Summary of findings

- Sixteen studies met the inclusion criteria and were included in the final synthesis. All studies reported on the current US dairy cattle cases except one study which reported on a study of dairy cattle in Pakistan.
- As of September 12, 2024, there have been three confirmed human cases of A(H5N1) and one confirmed human case of A(H5) in dairy farm workers who had direct exposure to infected cattle: one in Texas, two in separate farms in Michigan, and one in Colorado. The human cases have not been linked to each other.
- A(H5N1) has also been detected in cats and wild birds at affected dairy farms, suggesting transmission associated with infected dairy cattle.

- Two studies attempted to assess the transmission dynamics of A(H5N1) in dairy cows by inoculating two sets of cows: one intramammarily and one via aerosol exposure or oronasally. A(H5N1) was detected in both sets of cows as well as the milk of the cows inoculated intramammarily. Disease was more severe in the cows inoculated intramammarily.

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2.3 Abbreviations

AIV	Avian influenza virus
CDC	US Centers for Disease Control and Prevention
DPI	Days post-inoculation
HPAI	Highly pathogenic avian influenza
HPAIV	Highly pathogenic avian influenza virus
IAV	Influenza A virus
LPAIV	Low pathogenic avian influenza virus
NP	Nucleoprotein
NVSL	National Veterinary Services Laboratories
PCR	Polymerase chain reaction.
PHAC	Public Health Agency of Canada
PPE	Personal protective equipment
qrRT-PCR	Quantitative real-time reverse-transcription PCR
RNA	Ribonucleic acid
RT-PCR	Real-time reverse transcriptase-polymerase chain reaction

3 Background and Rationale

Highly pathogenic avian influenza (HPAI) is a viral infection that primarily targets birds, affecting both wild birds and domestic poultry ⁴. The virus can lead to severe illness in birds and spreads rapidly among susceptible avian species, often resulting in high mortality rates ⁴. Additionally, these viruses are able to mutate rapidly, leading to viral diversity and potentially increased transmission ⁵. Although most influenza viruses found in birds do not transmit to humans, certain strains, such as A(H5N1), can infect susceptible mammals, including humans, potentially posing a significant public health risk ⁴. In 2024, there have been 25 cases of A(H5N1) reported in humans worldwide, though no domestically acquired human infections have ever been reported in Canada ⁶. The A(H5N1) clade 2.3.4.4b virus emerged in 2020 and has spread globally resulting in widespread bird fatalities ⁴. It was first detected in Canada in December 2021 and has since been found in various mammalian species, likely due to contact with infected wild birds ⁴.

The ongoing global outbreaks of avian influenza, particularly the recent emergence of avian influenza A(H5N1) in dairy cattle in the United States, have raised significant public health concerns. With four human cases of avian influenza in the US linked to the cattle outbreaks as of September 12, 2024, and the potential for the virus to spread to Canada through importation, there is an urgent need to understand the risks associated with transmission from dairy cattle to humans.

It is critical to address the knowledge gaps surrounding the potential transmission of AIV to humans through exposure to dairy cattle and other livestock infected with avian influenza A(H5N1).

3.1 Purpose Statement

The purpose of this research is to conduct a rapid evidence synthesis to evaluate the risk of transmission of AIV to humans through exposure to infected dairy cattle and other livestock.

4 Research Question and Objective

4.1 Primary Question

- i. What is the risk of transmission to humans associated with exposure to avian influenza A(H5N1) virus associated with infected dairy cattle and other livestock that are hooved animals?

4.2 Secondary Question

- ii. What is the risk of transmission to other livestock associated with exposure to avian influenza A(H5N1) virus associated with infected dairy cattle?

5 Methods

The design and eligibility criteria for the systematic review were based on an *a priori* written unregistered protocol. There were no deviations from the protocol. The protocol and systematic review followed the recommendations of the Cochrane Handbook for Systematic Reviews of Interventions and was reported in accordance with the PRISMA reporting guidelines ^{1,2}. The PRISMA Checklist is presented in Appendix A.

5.1 Literature Search Methods

An experienced medical information specialist developed and tested the search strategies through an iterative process in consultation with the review team. Another senior information specialist peer-reviewed the MEDLINE strategy prior to execution using the PRESS Checklist ³. Using the multifile option and deduplication tool available on the Ovid platform, we searched Ovid MEDLINE® ALL and Embase. We also searched CINAHL and CAB Abstracts on Ebsco, and the Web of Science (core databases). We performed all searches on August 19, 2024. The original searches were updated on September 12, 2024.

The strategies utilized a combination of controlled vocabulary (e.g., “Influenza A Virus, H5N1 Subtype”, “Livestock”, “Occupational Exposure”) and keywords (e.g., “bird flu”, “cow”, “farmer”). Vocabulary and syntax were adjusted across the databases. Results were restricted to English and French and the publication years 2014 to the current date. The full search strategy is included Appendix B. Records were downloaded and deduplicated using EndNote version 9.3.3 (Clarivate Analytics) and uploaded to Covidence.

A grey literature search of provincial, territorial, federal, and international organizations was undertaken to identify guidance and other scientific and technical publications. Google Scholar was also searched. Bibliographic searches of relevant systematic reviews and other reports were conducted to identify studies that were not captured in the original searches.

5.2 Study Selection

A calibration exercise was conducted by four independent reviewers on samples of 100 retrieved abstracts. After >95% agreement was reached among reviewers, three independent reviewers screened the remaining abstracts in duplicate. Abstracts proceeded to full-text review if they reported on

confirmed A(H5N1) infection or A(H5N1) transmission rates in humans or livestock after exposure to dairy cattle, Table 1. Abstracts were excluded if they did not meet the inclusion criteria or were published in languages other than English or French. Abstracts selected for inclusion by either reviewer proceeded to full-text review.

Table 1. Eligibility Criteria

Population	<ul style="list-style-type: none"> • Humans: All population groups. • Non-human animals: dairy cattle and other livestock potentially exposed to dairy cattle associated with the current A(H5N1) outbreak. <ul style="list-style-type: none"> ○ Hooved livestock: cattle, sheep, goats, bison, water buffalo, cervids, swine, donkeys, horses, llamas, and alpacas. ○ Livestock: cattle, sheep, goats, bison, water buffalo, cervids, swine, donkeys, poultry, ratites, pigeons, pheasants, partridges, quail, grouse, guinea fowl, pea fowl, horses, rabbits, bees, llamas, alpacas, finfish, mollusks, and crustaceans intended for human consumption as food.
Intervention or Exposure	<ul style="list-style-type: none"> • Exposure: avian influenza A(H5N1) virus (irrespective of the clade) from dairy cattle or other hooved animals.
Comparator	<ul style="list-style-type: none"> • Not required
Outcomes	<ul style="list-style-type: none"> • Confirmed human infections with avian influenza A(H5N1) virus, from dairy cattle and other hooved livestock. • Confirmed infections of avian influenza A(H5N1) virus, from dairy cattle to other livestock animals listed above. • Transmission rates or risk of avian influenza A(H5N1) virus transmission, to humans from dairy cattle and other hooved livestock. • Transmission rates or risk of avian influenza A(H5N1) virus transmission, from dairy cattle to other livestock animals listed above.
Study design	<ul style="list-style-type: none"> • Any study design including laboratory studies
Publication types and language	<ul style="list-style-type: none"> • Preprints, primary studies, conference abstracts, technical reports, guidance documents, alerts, surveillance reports • English & French
Publication date	<ul style="list-style-type: none"> • 2014 - present

A similar calibration exercise was conducted by all four reviewers on ten samples of the retrieved full-text studies. After 95% agreement was reached among reviewers, full text review was conducted in duplicate by three independent reviewers. All discrepancies between reviewers were resolved through discussion and consensus.

5.3 Data Extraction and Analysis

Included studies were grouped into two groups: those that reported on infections or transmission in humans and livestock associated with the US cases and other studies. For the studies associated with the US cases, a timeline was constructed. For each study, the incident or index case discussed, the date infection or transmission was confirmed, and details on the case were extracted. For the other studies, the objective, method, and findings were extracted. Information was extracted by a single reviewer. A second reviewer verified the extracted data. Discrepancies between reviewers during data extraction were resolved through consensus.

6 Results

Summary of findings

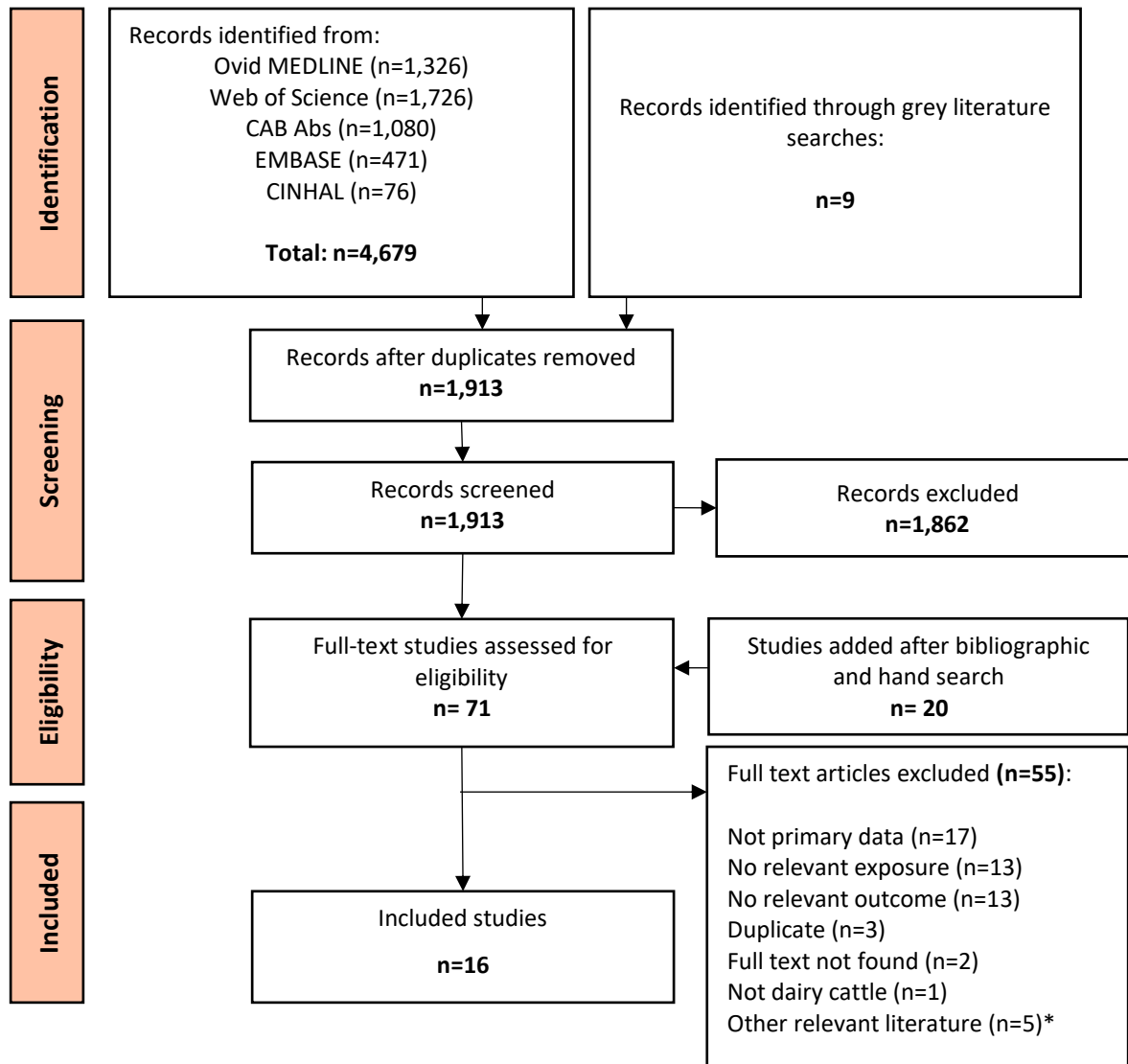
Sixteen studies were included in the final synthesis, 12 of which reported on the infections associated with dairy cattle in the US.

- A cluster of disease was identified in dairy cattle in the US in late January 2024 and influenza A(H5N1) was confirmed on March 25, 2024
- As of September 12, 2024, three human cases of A(H5N1) and one human case of A(H5) have been confirmed in dairy farm workers: one in Texas (April 1, 2024), two in Michigan at separate farms (May 22 and May 30, 2024), and one in Colorado (July 3, 2024)
- One human case of A(H5N1) was confirmed in Missouri on September 6, 2024, though the source of infection for this individual is unknown

Four other studies discussed A(H5N1) infection in dairy cattle.

- One from Pakistan tested 117 dairy farm workers and 376 swabs from dairy cattle and found no evidence of A(H5N1) infection
- Two from the US experimentally inoculated two sets of cows, one intramammarily and one via aerosol or oronasally. A(H5N1) was detected in both sets of cows post-inoculation. A(H5N1) was also detected in the milk from intramammarily inoculated cows. The disease was more severe in the cows inoculated intramammarily
- One from the US was an epidemiologic investigation of A(H5N1) transmission between dairy farms, as well as transmission to poultry farms, in Michigan in April and May 2024. The exact mechanism of spread between each premise is unknown, though the most likely route was through shared personnel, housing, and vehicles, frequent visitors, or movement of employees

The database and grey literature searches yielded 1,913 unique citations, 1,862 of which were excluded after abstract review. Twenty studies were identified through bibliographic and hand searches. Seventy-one studies proceeded to full-text review. After excluding 55 studies at the full-text review stage, 16 studies met the inclusion criteria and were included in the final synthesis⁷⁻²², Figure 1. Five studies that did not meet inclusion criteria were flagged as relevant and are discussed in Sections 7 and 8²³⁻²⁸. A full list of included studies is available in Appendix C.



*Five potentially relevant studies that did not meet the inclusion criteria are summarized in sections 7 and 8.

Figure 1: PRISMA Flow Chart of Study Selection

6.1 Timeline of infections and transmission

A timeline of infections and transmission is outlined in Table 2. Veterinarians were first alerted to a syndrome occurring in lactating dairy cattle in Texas on January 30, 2024¹⁰. The syndrome affecting cattle was confirmed to be A(H5N1) on March 25, 2024, in Texas, with herds in Kansas and Michigan also testing positive soon after. A(H5N1) was also suspected to be present in herds in New Mexico, Idaho,

and Ohio ^{10,16,20}. Deaths of wild birds and domestic cats were observed in affected farms and the virus was confirmed in cats in March 2024 ^{9,10}.

Table 2. Timeline of A(H5) infections and transmission for the events related to infected dairy cattle in the US in 2024

Incident/case	Confirmation date	Information
Clinical signs in dairy cattle first reported	January 30, 2024	<ul style="list-style-type: none"> • Veterinarians alerted to syndrome occurring in lactating dairy cattle in Texas first on January 30, 2024 ¹⁰
Identifications of virus in dairy cattle	March 2024	<ul style="list-style-type: none"> • A(H5N1) confirmed in dairy cattle in Texas on March 25, 2024, with confirmation in Kansas and Michigan following^{16,20} • Strains in Kansas, Texas, and Michigan are very similar and appear to have been introduced by wild birds ^{10,20} • Presumptive positive test results received for additional herds in New Mexico and Idaho ¹⁶ • Apparently healthy cattle were transported from one affected farm in Texas to a farm in Ohio, where cattle were later affected ¹⁰ • Deaths of wild birds and domestic cats observed within affected farms ^{10,20}
Virus detected in cats	March 21, 2024	<ul style="list-style-type: none"> • Brain and lung samples from two cats from an affected Texas dairy farm were positive for IAV and the A(H5) subtype ⁹ • Whole genome sequencing from a cat from an affected farm confirms infection with a A(H5N1) genotype B3.13 virus closely related to the viruses found in dairy cattle at that farm ^{9,10}
First confirmed human case following exposure to dairy cattle, Texas	April 1, 2024	<ul style="list-style-type: none"> • One person exposed to dairy cattle in Texas tested positive for A(H5N1) ^{11,15} • Patient symptoms: eye redness consistent with conjunctivitis, subconjunctival hemorrhage, thin serous drainage ^{11,17} • Vital signs unremarkable, normal respiratory effort, oxygen saturation of 97% ¹⁷ • No contact with sick or dead wild birds, poultry, or other animals ¹⁷ • Reported wearing gloves when working with cows but did not use respirator or eye protection ^{15,17} • Strain identified as clade 2.3.4.4b, also detected in peridomestic wild birds in Texas in March 2024 ¹⁷
Second confirmed human case following exposure to dairy cattle, Michigan	May 22, 2024	<ul style="list-style-type: none"> • One farmworker with regular exposure to infected dairy cows tested positive for A(H5N1) ^{18,19} • Patient symptoms: eye symptoms, conjunctivitis ^{14,18} • Patient reported direct ocular exposure to raw, unpasteurized milk from an affected cow ¹⁸

Third confirmed human case following exposure to dairy cattle , second in Michigan	May 30, 2024	<ul style="list-style-type: none"> • One farmworker with exposure to infected dairy cows tested positive for A(H5N1) ¹² • Patient symptoms: upper respiratory tract symptoms including cough without fever, eye discomfort with watery discharge ^{12,19} • First patient to report more typical symptoms of acute respiratory illness associated with A(H5N1) and influenza viruses ¹⁹ • Household contacts have not developed symptoms ¹² • None of the three human cases (TX(1), MI(2)) are associated with the others ¹²
Fourth confirmed human case following exposure to dairy cattle , Colorado	July 3, 2024	<ul style="list-style-type: none"> • Dairy farmworker with exposure to infected cows tested positive for A(H5) ¹³ • Patient symptoms: eye symptoms only ¹³
Monitoring of farmworkers in Michigan	July 25, 2024	<ul style="list-style-type: none"> • In total 1,288 Michigan residents have been monitored (306 dairy farmworkers, 957 poultry workers, 125 federal and state employees) after potential A(H5N1) exposure ¹⁹ <ul style="list-style-type: none"> ○ 53 (4.1%) reported signs and symptoms (6.5% of dairy farm workers, 2.1% of poultry workers, 12% of federal and state employees), 52 of whom received a test for influenza A(H5) ¹⁹ ○ 3.8% of all persons tested and <1% of all monitored persons tested positive (two Michigan cases) ¹⁹ ○ Neither worker was severely ill or required hospitalization and no household or work contacts reported being ill ¹⁹ ○ Both workers reported wearing some PPE but neither wore a mask or respirator ¹⁹

IAV: Influenza A virus; PPE: Personal protective equipment

On April 1, 2024, the Texas Department of State Health Services and CDC confirmed the first human case of A(H5N1) associated with dairy cattle ^{11,15}. The patient, a Texas farmworker, presented with eye redness, subconjunctival hemorrhage, and thin serous drainage with normal vital signs and respiratory effort ^{11,17}. The patient reported wearing gloves while working with cows but did not use a respirator or eye protection ¹⁷. The strain was identified as clade 2.3.4.4b, which was previously detected in dairy cattle and peridomestic wild birds in Texas in March 2024 ¹⁷.

On May 22, 2024, the CDC confirmed the second human case of A(H5N1) in a Michigan dairy farm worker ^{14,18,19}. The patient presented with eye symptoms and reported direct ocular exposure to raw, unpasteurized milk from an infected cow ^{14,18}.

The third human case was also reported in Michigan on May 30, 2024 ^{12,19}. This was the first patient to report more typical symptoms of acute respiratory illness associated with A(H5N1). The patient reported cough without fever as well as eye discomfort with watery discharge ¹². Neither Michigan case was severely ill or required hospitalization, and no household or work contacts reported being ill ¹⁹. None of the three human cases at this point were connected; all workers were from separate dairy farms ^{12,19}.

From the end of May to July 2024, Michigan residents with exposure to affected dairy cattle were monitored ¹⁹. Up to July 25, 2024, a total of 1,288 residents were monitored: 306 dairy farm workers, 957 poultry workers, and 125 federal and state employees who had contact with affected farms. In total, 4.1% reported signs and symptoms, including 6.5% of dairy farmworkers and 12% of federal and state employees. Fifty-three (53) people received a test for influenza A(H5); only the two reported cases tested positive, representing 3.8% of those tested and less than 1% of those monitored ¹⁹.

The fourth human case of A(H5) was reported on July 3, 2024, in Colorado ¹³. This patient, a dairy farm worker with exposure to infected cows, reported eye symptoms only ¹³.

6.2 Other studies

Four other studies were identified, Table 3. One was from Pakistan ⁷ and three were from the United States ^{8,21,22}. All were published in 2024.

Table 3. Other studies discussing the transmission of A(H5N1) in dairy cows or dairy farms

Author, country, year	Objective	Methods	Findings
Ahmed, Pakistan, 2024 ⁷	To monitor the prevalence of IAV, particularly the novel bovine A(H5N1) strain, among dairy cattle and farm workers in the Punjab province of Pakistan and assess the potential spillover of this virus from cattle to humans, given concerns about its zoonotic potential and previous reports of bovine A(H5N1) cases in the United States	<p>Study Population: Nasal wash samples were collected from farm workers (n=117) and nasal swabs (n=376) from dairy cattle between January 2023 and March 2024. The study took place at six commercial dairy farms located in various cities (Lahore, Kasur, Sahiwal, Multan, Layyah, and Bahawalpur) within Punjab, Pakistan.</p> <p>Milk Sampling: Additional milk samples (n=243) were collected from these farms in April 2024.</p> <p>Laboratory Techniques: Viral RNA was extracted from all samples using a commercial RNA extraction kit. One-step RT-PCR was performed to detect the A(H5N1) virus.</p>	<p>No Evidence of Infection: The study found no evidence of A(H5N1) infection in any of the samples collected from cattle or farm workers.</p> <p>Conclusion: These findings suggest that A(H5N1) was not endemic in the dairy cattle population in Punjab during the study period. The absence of A(H5N1) could be attributed to strict biosecurity measures at the farms.</p> <p>Study Limitations: The authors noted that the small sample size, limited geographic area, and short duration of the study were limitations. They recommended more comprehensive studies, including more cattle farms across other provinces, to fully understand the prevalence of bovine A(H5N1) in Pakistan.</p>
Baker, US, 2024 ⁸	To investigate the transmission of HPAI A(H5N1), clade 2.3.4.4b, in dairy cows, and to experimentally reproduce the infection in Holstein yearling heifers and lactating cows to understand transmission dynamics, clinical effects, and viral behavior in dairy cattle.	<p>Strain Characterization:</p> <ul style="list-style-type: none"> The HPAI A(H5N1) genotype B3.13 virus was analyzed through RNA amplification, followed by cDNA library generation using Illumina sequencing kits. <p>Cow Intramammary Inoculation:</p> <ul style="list-style-type: none"> Two lactating Holstein cows were inoculated intramammarily with a viral solution in two quarters of their mammary glands using a teat canula, 	<p>Phylogenetic Analysis:</p> <ul style="list-style-type: none"> The B3.13 genotype of the A(H5N1) virus persisted in dairy cattle after spillover from migratory birds. The virus formed a single monophyletic clade with no evidence of reassortment. <p>Viral Detection and Clinical Observations:</p> <ul style="list-style-type: none"> Inoculated lactating cows developed mastitis in specific mammary gland quarters, with changes in milk color, consistency, and production. Milk production declined,

		<p>after being acclimated in a BSL3-Ag containment facility.</p> <p>Calf Aerosol Inoculation:</p> <ul style="list-style-type: none"> • Five Holstein heifer calves were inoculated via aerosol using a portable equine nebulizer to deliver the viral solution into their nostrils and mouth. <p>Virus Detection and Antibody Analysis:</p> <ul style="list-style-type: none"> • RT-qPCR was performed to detect viral RNA in clinical samples, and whole-genome sequencing was done on positive samples. • Seroconversion was determined using an ELISA to detect antibodies to the viral nucleoprotein. 	<p>reaching 71-77% of pre-inoculation levels by day 23 post-inoculation.</p> <ul style="list-style-type: none"> • Viral RNA was detected in the milk from inoculated mammary quarters continuously from 1 DPI to the end of the study • Virus isolation was positive in milk samples from the inoculated quarters up to 12 DPI but negative thereafter. • Heifer calves had sporadic RT-qPCR detections in nasal and oropharyngeal samples, with all calves testing positive at least once. • Heifer calves displayed no significant illness, except for minor nasal secretion increases. <p>Antibody Responses:</p> <ul style="list-style-type: none"> • Both cows developed NP antibodies by 7 DPI and remained seropositive. • Heifer calves also seroconverted between 7 and 13 DPI. • Virus neutralization and hemagglutination inhibition assays indicated positive responses in inoculated quarters.
Halwe, US, 2024 ²¹	To investigate the clinical outcome, pathogenicity, transmission, and tissue tropism of A(H5N1) clade 2.3.4.4b in calves and multiparous lactating cows	<p>Oronasal inoculation:</p> <ul style="list-style-type: none"> • Calves (n=6) were oronasally inoculated with 1×10^6 TCID₅₀/calf of a A(H5N1) B3.13 virus suspension • Two days post-inoculation, infected calves were co-housed with sentinel animals (n=3) • Three calves were negative controls <p>Intramammary inoculation:</p>	<p>Subclinical disease in oronasally infected calves:</p> <ul style="list-style-type: none"> • Signs of mild respiratory illness were observed in calves, including nasal mucus secretions and coughing • Rectal temperatures remained within the normal range and all calves maintained a normal appetite and normal activity levels • No other clinical signs were observed <p>Severe disease in intramammary inoculated cows:</p>

		<ul style="list-style-type: none"> • Three lactating cows (n=3) were inoculated intramammarily with 2 mL (0.5 mL per teat) of A(H5N1) virus suspension containing $10^{5.9}$ TCID₅₀ • Three lactating cows were inoculated with $10^{6.1}$ TCID₅₀ per 2 mL (0.5 mL per teat) of a virus suspension of an EU genotype euDG A(H5N1) clade 2.3.4.4b wild bird virus isolate (H5N1 euDG) • One lactating cow was a negative control 	<ul style="list-style-type: none"> • Clinical disease was induced as early as 1 dpi with impaired general condition, postural abnormalities, and lethargy • All six inoculated cows developed fever starting 2 dpi • Drastically reduced feed intake was observed in both groups • One cow in each group displayed clinical signs that met criteria for immediate humane euthanasia at 3 dpi, including refusal of feed and water intake, dehydration, lethargy, and postural and motion disorders • Two additional cows, one in each group, were also euthanized at 9 dpi and 13 dpi <p>Milk production in intramammary inoculated cows:</p> <ul style="list-style-type: none"> • After infection, milk yields rapidly decreased by more than 90% with only partial recovery observed in the animals remaining at 21 dpi • Starting at 2 dpi, the milk became mucilaginous and viscous and rapidly separated into a serious and solid fraction • Onset of severe mastitis was confirmed in both groups as early as 1 dpi <p>Viral shedding in inoculated calves and cows:</p> <ul style="list-style-type: none"> • In oronasally inoculated calves, shedding of IAV RNA was observed in five of the six infected calves for a maximum of 8 days, primarily in nasal swabs • Low to medium levels of RNA were detected, with peak shedding occurring in nasal swabs between 5-7 dpi
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			<ul style="list-style-type: none"> • IAV RNA was also detected in oral swabs, most frequently at 4-7 dpi, and only once in rectal swabs • All clinical samples collected from sentinel calves were negative for IAV RNA except for two suspect-positive rectal swabs, attributed to environmental contamination during sample collection, suggesting no transfer to sentinel calves • In lactating cows, RT-qPCR analyses of nasal, conjunctival, rectal swabs and urine samples from both groups were negative for viral RNA except for two nasal swabs and two urine samples at 2 and 3 dpi • Milk samples showed that all animals in both groups were positive starting at 1 dpi with peak viral genome loads at 3 dpi • Viral RNA was detectable in milk samples until 20 dpi <p>Organ samples:</p> <ul style="list-style-type: none"> • Of 40 organ samples collected from oronasally inoculated calves, IAV RNA was found only in mucosa-associated lymphoid tissue of one principal infected calf at 7 dpi • In lactating cows, RT-qPCR analysis of tissues revealed peak viral RNA loads in mammary glands • Organ samples of the respiratory tract remained negative in all animals of this group
US Department of Agriculture,	To investigate the links between HPAI affected dairy premises and evidence of spillover into	<ul style="list-style-type: none"> • On April 10, 2024, USDA epidemiologists were invited by the Michigan Department of Agriculture and Rural Development to investigate detections of 	Results summarize 15 dairy herds and 8 poultry flocks that were confirmed in Michigan between March 29, 2024, and May 16, 2024, to have HPAI A(H5N1)

<p>US, June 9, 2024 ²²</p>	<p>poultry premises in Michigan</p>	<p>HPAI in Michigan dairies with evidence of spillover into poultry premises</p> <ul style="list-style-type: none"> • All affected dairy herds in Michigan were identified by reporting sick cattle to the Michigan Department of Agriculture and Rural Development • Samples were submitted to the Michigan State University Veterinary Diagnostic Laboratory • Initial epidemiological information was collected at the time of reporting of clinical signs, followed by administration of the USDA Dairy Cattle Emerging Health Event: Epidemiological Questionnaire • Whole genome sequencing and follow-up field investigations were conducted with producers and herd veterinarians on affected dairy premises and associated animal businesses (e.g., feed deliveries) 	<p>Most links between affected dairy premises and between dairy and poultry premises and indirect from shared people, vehicles, and equipment</p> <p>Summary of disease spread between dairy premises:</p> <ul style="list-style-type: none"> • Michigan’s first affected dairy was infected by the importation of cattle from an affected herd in Texas • The exact mechanism of spread between each premise is unknown <p>Spread between dairy and poultry premises: the only potential transmission route, other than via wild birds or peridomestic species, was through shared employment, housing, or movement of employees</p> <p>Potential risk factors for local transmission:</p> <ul style="list-style-type: none"> • Shared personnel between premises <ul style="list-style-type: none"> ○ 20% of affected dairies’ employees and 7% of dairies’ employees family members work on other dairy premises ○ 7% of affected dairies’ employees also work on poultry premises ○ 31% of dairies have employees who own livestock or poultry at their personal residence • Shared vehicles between premises: 62% of affected dairy premises use shared vehicles to transport cattle, with only 12% cleaning vehicles before use
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			<ul style="list-style-type: none"> • Frequent visitors on/off premises <ul style="list-style-type: none"> ○ All affected dairy premises have regular visits by veterinarians, nutritionist/feed consultant, and/or contract haulers, most of which have direct contact with cattle ○ 40% of dairy premises have regular visits for deadstock removal, and 53% of affected dairies utilized the same deadstock removal company
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DPI: days post-inoculation; HPAI: highly pathogenic avian influenza; IAV: influenza virus A; NP: nucleoprotein; RT-qPCR: reverse transcription quantitative real-time PCR; TCID₅₀: 50% tissue culture infectious dose

The study from Pakistan aimed to monitor the prevalence of influenza A, particularly A(H5N1), among dairy cattle and farm workers ⁷. Nasal wash samples were collected from farmworkers (n=117) and nasal swabs were collected from dairy cattle (n=376) from January 2023 to March 2024. There was no evidence of A(H5N1) infection in any of the samples taken from cattle or farmworkers ⁷.

Two studies from the US attempted to investigate the transmission of A(H5N1) clade 2.3.4.4b in dairy cows ^{8,21}. The first attempted to experimentally reproduce the infection in yearling heifers and lactating cows ⁸. The A(H5N1) genotype B3.13 virus was analyzed through RNA amplification and was determined to have spilled over into cattle from wild migratory birds. To test transmission of A(H5N1), two lactating cows were inoculated intramammarily with viral solution in two quarters of their mammary glands. Additionally, five calves were inoculated via aerosol using an equine nebulizer to deliver a viral solution to their nose and nostrils. The inoculated cows developed mastitis and had changes in milk colour, consistency, and production. Viral RNA was detected in the milk from inoculated mammary quarters continuously from one day post-inoculation to the end of the study, and virus isolation was positive in milk samples up to 12 days post-inoculation. The calves had sporadic viral detections, with all calves testing positive at least once. Seroconversion was also detected in inoculated cows by day seven post-inoculation and in calves between days seven and 13 post-inoculation ⁸.

In the second study, six calves were inoculated oronasally and co-housed with sentinel animals ²¹. Additionally, six lactating cows were inoculated intramammarily, three with A(H5N1) and three with an EU genotype wild bird virus isolate (H5N1 euDG). In the oronasally infected calves, signs of mild respiratory illness were observed, including nasal mucus and coughing. No other clinical signs were observed: rectal temperatures remained within the normal range, and all calves maintained a normal appetite and normal activity levels. Low to medium levels of IAV RNA shedding was observed in five of the six infected calves for a maximum of eight days, with peak shedding occurring between five- and seven-days post-inoculation. Viral RNA was mostly detected in nasal swabs, but also in oral swabs. All clinical samples collected from sentinel calves were negative, except for two with suspected environmental contamination. Severe disease was observed in the cows inoculated intramammarily. Symptoms included postural abnormalities, lethargy, fever, refusal of feed and water, and dehydration. Four cows in total were euthanized, two in each group. Milk production was also severely limited, with milk yields reducing by 90% with only partial recovery in the cows remaining at 21 days. Nasal, conjunctival, rectal swabs and urine samples from both groups were negative for viral RNA except for

two nasal swabs and two urine samples. However, milk samples were positive starting at one-day post-inoculation and lasting up to 20-days post-inoculation ²¹.

The last study was an epidemiological study of A(H5N1) in Michigan dairy farms and poultry flocks ²². The epidemiological investigation confirmed that Michigan's first affected dairy farm was infected by the importation of cattle from an affected herd in Texas. The exact mechanism of spread between each dairy premise is unknown. As for spread to poultry premises, the most likely route was through shared employment, housing, or movement of employees. Potential risk factors for spread both between dairy facilities and from dairy facilities to poultry facilities include shared personnel between premises, shared vehicles between premises, and frequent visitors to premises ²².

7 Other infections and transmissions reported

Two identified reports discussed additional infections and transmissions of A(H5N1). The first study reports findings from the National Veterinary Services Laboratories (NVSL), which confirmed the first-ever detection of HPAI A(H5N1) in alpacas ²⁵. This occurred on a farm where HPAI-affected poultry had previously been depopulated in May 2024. Due to the high viral load in the environment and the comingling of various livestock species on the farm, the detection of HPAI was expected. However, the confirmation in alpacas is significant as it marks the first case of HPAI in this species. Genome sequencing revealed that the virus shared the same strain (B3.13) circulating in dairy cattle and depopulated poultry on the farm, suggesting cross-species transmission. NVSL confirmed the results via PCR testing and reported the case to the World Organization for Animal Health ²⁵.

The second report, from the CDC, confirmed a human case of A(H5N1) in Missouri on September 6, 2024 ^{23,29}. The case, detected through routine seasonal flu surveillance, is significant because it represents the first human A(H5N1) case in the US without a known animal exposure or occupational risk. The patient was hospitalized and treated with antiviral medications before being discharged. While no ongoing transmission among close contacts has been identified, the source of infection remains unclear. This is the 14th reported case of A(H5N1) in the United States. Four of these cases were linked to exposure to sick dairy cows, while nine were associated with exposure to poultry. The CDC is continuing its investigation, and although the risk to the general public remains low, future transmission potential is being closely monitored. Genetic sequencing of the virus is ongoing to better understand the nature of the infection ²³.

8 Other relevant literature identified

Three studies identified through our search did not meet the inclusion criteria but remain relevant. Two of these studies were conducted in the US ^{24,26}, while the third was from the Pan-American Health Organization assessing the region of the Americas (North America, Central America, South America, and in the Caribbean) ²⁷, which was also updated on October 8, 2024 ³⁰.

One study conducted in the US analyzed the genetic sequence data of A(H5N1) clade 2.3.4.4b in North America, focusing on its introduction, circulation, and genetic evolution, particularly its impact on dairy cattle ²⁴. The study reported that the virus was first identified in wild birds in December 2021, with various genotypes detected across the US. Notable introductions occurred through both the Pacific and Atlantic flyways, including reassorted Eurasian viruses. While the virus spread among wild birds, poultry, and various mammal species, lateral transmission among poultry flocks was limited. The A(H5N1) virus was first detected in dairy cattle in March 2024, leading to decreased milk production and changes in milk quality. Genotype B3.13 was identified in multiple herds across several states. Phylogenetic analysis suggested a single introduction event into cattle, followed by local circulation and subsequent transmission to domestic cats, poultry, and peridomestic animals. Genetic reassortment in migratory birds contributed to the emergence of new genotypes, including B3.13, with some events increasing transmission efficiency, particularly in mammals. Within-host sequence variants were detected, including changes associated with increased pathogenicity, virulence, and mammalian adaptation, such as variants in the PB2 gene (e.g., E627K, D701N, M631L). While these genetic changes suggested potential phenotypic shifts, direct evidence of such changes was not confirmed. Phylodynamic analyses revealed rapid viral spread across states, driven by cattle movement, and highlighted potential zoonotic risks. The study emphasizes the need for continuous monitoring of viral evolution and transmission to address data gaps and ensure comprehensive surveillance of emerging viral strains ²⁴.

Another study, also conducted in the US, used geospatial and exposure analyses to investigate the introduction and transmission of A(H5N1) to dairy farms ²⁶. The study documented 33 outbreaks up to April 30, 2024, with Texas reporting the highest number. The initial outbreak occurred in Castro County, Texas, on March 10, 2024, shortly before A(H5N1) was confirmed in dairy cattle. Among these outbreaks, 10 began before confirmed cases in cattle. The study found that dairy cattle were more

exposed to non-waterfowl species than waterfowl and observed outbreaks in poultry and domestic animals near dairy farms, suggesting potential spillover and transmission pathways ²⁶.

The last report was a risk assessment from the Pan American Health Organization (PAHO) on the public health risks associated with zoonotic avian influenza A(H5N1) clade 2.3.4.4b in North America, Central America, South America, and in the Caribbean ²⁷. The assessment considered virus dissemination, human health impacts, and regional response capabilities. It classified the overall human health risk as "Low" with "Moderate" confidence, noting that the virus mainly affects avian receptors, limiting human transmission. While localized outbreaks in dairy cattle and potential spillovers to mammals and humans were observed, the region's robust preparedness initiatives are highlighted. Recommendations include enhancing surveillance and response mechanisms to effectively manage potential outbreaks ²⁷.

An updated report was published by PAHO on October 8, 2024 ³⁰. It emphasizes the need for collaborative and intersectoral efforts among Member States to safeguard both animals and public health from A(H5N1) and calls for strengthening protocols for detecting, notifying, and responding to outbreaks in animals, as well as identifying human cases. The Pan American Health Organization stresses the importance of sharing various samples with World Health Organization Collaborating Centers to aid in risk analysis and vaccine preparations. The report highlights a rise in avian influenza transmission to mammals, driven by ecological changes. Although human cases remain rare, the report notes 19 human cases of avian influenza in the Americas since 2022, including 16 cases in the United States in 2024, with some linked to cattle exposure and the first documented mammal-to-human transmission. PAHO/WHO urges enhanced surveillance and biosecurity measures to prevent animal-to-human transmission and to ensure preparedness for potential pandemics. This includes sharing genetic data, reinforcing surveillance in both humans and animals, and adopting a One Health approach that integrates human, animal, and environmental health sectors ³⁰.

9 Conclusions

There is limited literature published on the transmission of A(H5N1) from cattle to humans and other livestock; nearly all the literature focuses on the current US cattle cases. As of September 12, 2024, there are three confirmed cases of A(H5N1) and one confirmed case of A(H5) in humans with exposure to infected dairy cattle. There is also evidence suggesting transmission between cows and from cows to other species, including cats, alpacas, rodents, and wild birds.

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Appendices

11.1 Appendix A. PRISMA Checklist

Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	ii, 10
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	N/A
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	8
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	9
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	10, 11
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.	10
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	Appendix B
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.	10, 11
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.	12
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.	N/A
	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.	N/A
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.	N/A

Section and Topic	Item #	Checklist item	Location where item is reported
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.	N/A
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)).	12
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	12
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	12
	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.	12
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	N/A
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	N/A
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	N/A
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	N/A
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.	13, 14
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	N/A
Study characteristics	17	Cite each included study and present its characteristics.	14-20
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	N/A
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.	N/A
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	N/A
	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.	N/A

Section and Topic	Item #	Checklist item	Location where item is reported
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	N/A
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	N/A
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	N/A
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	N/A
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	25
	23b	Discuss any limitations of the evidence included in the review.	N/A
	23c	Discuss any limitations of the review processes used.	N/A
	23d	Discuss implications of the results for practice, policy, and future research.	N/A
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.	10
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	N/A
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	N/A
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	26
Competing interests	26	Declare any competing interests of review authors.	26
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.	N/A

From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ* 2021;372:n71. doi: 10.1136/bmj.n71

11.2 Appendix B. Search Strategy

2024 Aug 19

Ovid Multifile

Database: Embase <1974 to 2024 August 16>, Ovid MEDLINE(R) ALL <1946 to August 15, 2024>

Search Strategy:

-
- 1 Influenza A Virus, H5N1 Subtype/ (8902)
 - 2 (H5N1 or HPAI).tw,kw,kf. (18405)
 - 3 ((avian or bird?) adj3 (flu or flus or influenza*)).tw,kw,kf. (30726)
 - 4 "clade 2.3.4.4b".tw,kw,kf. (648)
 - 5 or/1-4 [AVIAN FLU] (37736)
 - 6 Agriculture/ (114166)
 - 7 Farms/ (22084)
 - 8 Livestock/ (26210)
 - 9 (livestock? or live stock?).tw,kw,kf. (82719)
 - 10 (animal? adj3 farm*).tw,kw,kf. (19738)
 - 11 Dairying/ (25730)
 - 12 (dairy* adj3 farm*).tw,kw,kf. (19112)
 - 13 Cattle/ (600799)
 - 14 (cattle or cow or cows or calf or calves or heifer?).tw,kw,kf. (449750)
 - 15 (dairy adj3 herd?).tw,kw,kf. (13177)
 - 16 Goats/ (66925)
 - 17 (goat or goats or capra or capras).tw,kw,kf. (87247)
 - 18 Horses/ (139758)
 - 19 (horse or horses).tw,kw,kf. (137314)
 - 20 (equus adj3 (caballus or domestic* or przewalskii)).tw,kw,kf. (2269)
 - 21 Sheep/ or Sheep, Domestic/ (229724)
 - 22 (sheep or ewe or ewes or ram or rams or tup or tups or (ovis adj2 aries)).tw,kw,kf. (240727)
 - 23 exp Swine/ (349274)
 - 24 (boar or boars or gilt or gilts or hog or hogs or pig or pigs or piglet? or sow or sows or suidae or (sus adj2 domestic*) or swine?).tw,kw,kf. (611772)
 - 25 Bees/ (27764)
 - 26 (apiary or apiaries or apiculture* or api-culture* or apoidea or bee or bees or beekeep*).tw,kw,kf. (48703)
 - 27 Bison/ (1483)
 - 28 bison?.tw,kw,kf. (2941)
 - 29 Buffaloes/ (16514)
 - 30 (bubalu* or buffalo* or syncerus).tw,kw,kf. (28862)
 - 31 Camelids, New World/ (2972)
 - 32 (alpaca* or guanaco* or lama or lamas or llama? or vicuna?).tw,kw,kf. (12178)
 - 33 (camelid? adj3 (new world or america*)).tw,kw,kf. (964)
 - 34 Columbidae/ (14836)
 - 35 (columbidae or columba livia or pigeon?).tw,kw,kf. (28311)
 - 36 exp Deer/ (26813)
 - 37 (deer or deers or cervid*).tw,kw,kf. (29383)
 - 38 *The human risk to avian influenza A(H5N1) associated with infected dairy cattle and other livestock*

38 (grouse? or tetraoni*).tw,kw,kf. (1266)

39 (guinea fowl? or guineafowl? or guinea hen? or guineahen? or numididae).tw,kw,kf. (1378)

40 (partridge? or perdicine? or pavo or pavos or peacock? or pea cock? or peafowl? or pea fowl? or pea hen? or peahen? or pheasant?).tw,kw,kf. (6015)

41 exp Poultry/ (200419)

42 (poultry or poultries or (domestic* adj3 fowl?) or chicken* or (domestic* adj3 gallus) or gallus gallus or duck or ducks or geese or goose or turkey or turkeys or meleagridi*).tw,kw,kf. (435536)

43 Palaeognathae/ (337)

44 (palaeognath* or ratite?).tw,kw,kf. (895)

45 exp Quail/ (18026)

46 (quail or quails or colinus or coturnix or bob-white? or bobwhite?).tw,kw,kf. (21034)

47 Rabbits/ (367718)

48 (hare or hares or leporidae or rabbit or rabbits).tw,kw,kf. (551149)

49 exp Aquaculture/ (36059)

50 (aquacultur* or aqua-cultur* or aquafarm* or aqua-farm* or aquatic farm* or aquiculture* or aqui-culture* or fisheries or fishery or fishfarm* or (fish* adj3 farm*) or fishhatcher* or fish hatcher* or finfish* or fin fish* or finned fish* or mariculture* or mari-culture* or pisciculture* or pisci-culture*).tw,kw,kf. (77544)

51 exp Mollusca/ (142419)

52 (mollusc* or mollusk*).tw,kw,kf. (44924)

53 exp Crustacea/ (112692)

54 (crustacea* or shellfish* or shell fish*).tw,kw,kf. (55685)

55 or/6-54 [LIVESTOCK, DAIRY FARMS] (3686099)

56 5 and 55 [H5N1 - LIVESTOCK, DAIRY FARMS] (19678)

57 Humans/ (42641362)

58 (human or humans or people or person? or people or child* or boy or boys or girl or girls or man or men or wom#n).tw,kw,kf. (17309903)

59 Farmers/ (34207)

60 ((agricultur* or dairy* or farm*) adj3 (employee? or force or forces or individual? or labo?r* or people or personnel or person? or staff or worker? or workforce?)).tw,kw,kf. (21624)

61 (dairyfarmer? or dairyworker? or farmer? or farmhand? or farmworker?).tw,kw,kf. (71529)

62 ((food? or meat? or meatpack* or meatprocess* or milk or milking or slaughter*) adj3 (employee? or force or forces or handler? or labo?r* or people or personnel or person? or staff or worker? or workforce?)).tw,kw,kf. (18346)

63 (hunter? or trapper?).tw,kw,kf. (23020)

64 Environmental Exposure/ (213771)

65 Occupational Exposure/ (154687)

66 ((environment* or occupation* or work* or employee? or individual? or labo?r* or people or personnel or person? or staff or worker? or workforce?) adj3 (expos* or infect*)).tw,kw,kf. (508183)

67 or/57-66 [HUMANS, DAIRY/FARM WORKERS, FOOD PROCESSING WORKERS, ETC.] (47802953)

68 56 and 67 [H5N1 - LIVESTOCK, DAIRY FARMS - HUMANS, DAIRY/FARM WORKERS, FOOD PROCESSING WORKERS, ETC.] (10227)

69 limit 68 to yr="2020-current" [DATE LIMIT APPLIED] (2249)

70 limit 69 to english (2212)

71 limit 69 to french (1)

72 70 or 71 [LANGUAGE LIMITS] (2213)

73 72 use medall [MEDLINE RECORDS] (1046)

74 "Influenza A virus (H5N1)"/ (9166)
75 (H5N1 or HPAI).tw,kw,kf. (18405)
76 ((avian or bird?) adj3 (flu or flus or influenza*)).tw,kw,kf. (30726)
77 "clade 2.3.4.4b".tw,kw,kf. (648)
78 or/74-77 [AVIAN FLU] (37854)
79 agriculture/ (114166)
80 agricultural land/ (16350)
81 livestock/ (26210)
82 (livestock? or live stock?).tw,kw,kf. (82719)
83 exp farm animal/ (60739)
84 (animal? adj3 farm*).tw,kw,kf. (19738)
85 dairying/ (25730)
86 (dairy* adj3 farm*).tw,kw,kf. (19112)
87 cattle/ (600799)
88 exp domestic cattle/ (15235)
89 dairy cattle/ (12072)
90 heifer/ (2367)
91 (cattle or cow or cows or calf or calves or heifer?).tw,kw,kf. (449750)
92 (dairy adj3 herd?).tw,kw,kf. (13177)
93 exp goat/ (73042)
94 (goat or goats or capra or capras).tw,kw,kf. (87247)
95 exp horse/ (153413)
96 (horse or horses).tw,kw,kf. (137314)
97 (equus adj3 (caballus or domestic* or przewalskii)).tw,kw,kf. (2269)
98 exp sheep/ (242896)
99 (sheep or ewe or ewes or ram or rams or tup or tups or (ovis adj2 aries)).tw,kw,kf. (240727)
100 exp pig/ (99503)
101 (boar or boars or gilt or gilts or hog or hogs or pig or pigs or piglet? or sow or sows or suidae or
(sus adj2 domestic*) or swine?).tw,kw,kf. (611772)
102 exp bee/ (38439)
103 (apiary or apiaries or apiculture* or api-culture* or apoidea or bee or bees or beekeep*).tw,kw,kf.
(48703)
104 exp bison/ (1706)
105 bison?.tw,kw,kf. (2941)
106 water buffalo/ (9004)
107 (bubalu* or buffalo* or syncerus).tw,kw,kf. (28862)
108 exp New World camelid/ (4681)
109 alpaca/ (3554)
110 (alpaca* or guanaco* or lama or lamas or llama? or vicuna?).tw,kw,kf. (12178)
111 exp New World camelid/ (4681)
112 (camelid? adj3 (new world or america*)).tw,kw,kf. (964)
113 exp columbidae/ (15733)
114 (columbidae or columba livia or pigeon?).tw,kw,kf. (28311)
115 exp deer/ (26813)
116 (deer or deers or cervid*).tw,kw,kf. (29383)
117 exp grouse/ (175)
118 (grouse? or tetraoni*).tw,kw,kf. (1266)

119 exp guineafowl/ (202)
 120 (guinea fowl? or guineafowl? or guinea hen? or guineahen? or numididae).tw,kw,kf. (1378)
 121 exp phasianinae/ or exp perdicinae/ (27141)
 122 (partridge? or perdicine? or pavo or pavos or peacock? or pea cock? or peafowl? or pea fowl? or
 pea hen? or peahen? or pheasant?).tw,kw,kf. (6015)
 123 exp poultry/ (200419)
 124 (poultry or poultries or (domestic* adj3 fowl?) or chicken* or (domestic* adj3 gallus) or gallus
 gallus or duck or ducks or geese or goose or turkey or turkeys or meleagridi*).tw,kw,kf. (435536)
 125 exp ratite/ (3181)
 126 (palaeognath* or ratite?).tw,kw,kf. (895)
 127 exp quail/ (18026)
 128 (quail or quails or colinus or coturnix or bob-white? or bobwhite?).tw,kw,kf. (21034)
 129 exp leporidae/ (391205)
 130 (hare or hares or leporidae or rabbit or rabbits).tw,kw,kf. (551149)
 131 aquaculture/ (25391)
 132 exp mariculture/ (625)
 133 exp pisciculture/ (2146)
 134 (aquacultur* or aqua-cultur* or aquafarm* or aqua-farm* or aquatic farm* or aquiculture* or
 aqui-culture* or fisheries or fishery or fishfarm* or (fish* adj3 farm*) or fishhatcher* or fish hatcher* or
 finfish* or fin fish* or finned fish* or mariculture* or mari-culture* or pisciculture* or pisci-
 culture*).tw,kw,kf. (77544)
 135 exp crustacea/ (112692)
 136 (crustacea* or shellfish* or shell fish*).tw,kw,kf. (55685)
 137 exp mollusc/ (142419)
 138 (mollusc* or mollusk*).tw,kw,kf. (44924)
 139 exp shellfish farming/ (297)
 140 or/79-139 [LIVESTOCK, DAIRY FARMS] (3645103)
 141 78 and 140 [H5N1 - LIVESTOCK, DAIRY FARMS] (19748)
 142 exp human/ (49149721)
 143 (human or humans or people or person? or people or child* or boy or boys or girl or girls or man
 or men or wom#n).tw,kw,kf. (17309903)
 144 agricultural worker/ (34207)
 145 ((agricultur* or dairy* or farm*) adj3 (employee? or force or forces or individual? or labo?r* or
 people or personnel or person? or staff or worker? or workforce?)).tw,kw,kf. (21624)
 146 (dairyfarmer? or dairyworker? or farmer? or farmhand* or farmworker?).tw,kw,kf. (71529)
 147 ((food? or meat? or meatpack* or meatprocess* or milk or milking or slaughter*) adj3
 (employee? or force or forces or handler? or labo?r* or people or personnel or person? or staff or
 worker? or workforce?)).tw,kw,kf. (18346)
 148 (hunter? or trapper?).tw,kw,kf. (23020)
 149 exposure/ (185943)
 150 environmental exposure/ (213771)
 151 occupational exposure/ (154687)
 152 ((environment* or occupation* or work* or employee? or individual? or labo?r* or people or
 personnel or person? or staff or worker? or workforce?) adj3 (expos* or infect*)).tw,kw,kf. (508183)
 153 or/142-152 [HUMANS, DAIRY/FARM WORKERS, FOOD PROCESSING WORKERS, ETC.] (52082573)
 154 141 and 153 [H5N1 - LIVESTOCK, DAIRY FARMS - HUMANS, DAIRY/FARM WORKERS, FOOD
 PROCESSING WORKERS, ETC.] (10517)

155 limit 154 to yr="2020-current" [DATE LIMIT APPLIED] (2257)
 156 limit 155 to english (2220)
 157 limit 155 to french (1)
 158 156 or 157 [LANGUAGE LIMITS] (2221)
 159 158 use oemezd [EMBASE RECORDS] (1180)
 160 73 or 159 [BOTH DATABASES] (2226)
 161 remove duplicates from 160 (1376) [TOTAL UNIQUE RECORDS]
 162 161 use medall [MEDLINE UNIQUE RECORDS] (1044)
 163 161 use oemezd [EMBASE RECORDS] (332)

CINAHL

#	Query	Limiters/Expanders	Last Run Via	Results
S60	S57 AND S58	Limiters - Publication Date: 20200101-20241231 Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	54
S59	S57 AND S58	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	459
S58	LA English OR LA French	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	8,807,773

			Database - CINAHL Plus with Full Text	
S57	S45 AND S56	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	463
S56	S46 OR S47 OR S48 OR S49 OR S50 OR S51 OR S52 OR S53 OR S54 OR S55	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	3,649,356
S55	TI (environment* or occupation* or work* or employee# or individual# or labo#r* or people or personnel or person# or staff or worker# or workforce#) N3 (expos* or infect*) OR AB (environment* or occupation* or work* or employee# or individual# or labo#r* or people or personnel or person# or staff or worker# or workforce#) N3 (expos* or infect*))	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	47,144
S54	MH "Occupational Exposure"	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen -	21,638

			Advanced Search Database - CINAHL Plus with Full Text	
S53	MH "Environmental Exposure"	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	20,429
S52	TI (hunter# or trapper#) OR AB (hunter# or trapper#)	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	1,397
S51	TI ((food# or meat# or meatpack* or meatprocess* or milk or milking or slaughter*) N3 (employee# or force or forces or handler# or labo#r* or people or personnel or person# or staff or worker# or workforce#)) OR AB ((food# or meat# or meatpack* or meatprocess* or milk or milking or slaughter*) N3 (employee# or force or forces or handler# or labo#r* or people or personnel or person# or staff or worker# or workforce#))	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	3,038
S50	TI (dairyfarmer# or dairyworker# or farmer# or farmhand* or farmworker#) OR AB (dairyfarmer# or dairyworker# or farmer# or farmhand* or farmworker#)	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases	4,524

			Search Screen - Advanced Search Database - CINAHL Plus with Full Text	
S49	TI (agricultur* or dairy* or farm*) N3 (employee# or force or forces or individual# or labo#r* or people or personnel or person# or staff or worker# or workforce#)) OR AB (agricultur* or dairy* or farm*) N3 (employee# or force or forces or individual# or labo#r* or people or personnel or person# or staff or worker# or workforce#))	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	2,122
S48	MH "Farmworkers"	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	4,097
S47	TI (human or humans or people or person# or people or child* or boy or boys or girl or girls or man or men or wom?n) OR AB (human or humans or people or person# or people or child* or boy or boys or girl or girls or man or men or wom?n)	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	1,787,641
S46	MH "Human"	Search modes - Find all my search terms	Interface - EBSCOhost	2,823,955

			Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	
S45	S5 AND S44	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	829
S44	S6 OR S7 OR S8 OR S9 OR S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26 OR S27 OR S28 OR S29 OR S30 OR S31 OR S32 OR S33 OR S34 OR S35 OR S36 OR S37 OR S38 OR S39 OR S40 OR S41 OR S42 OR S43	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	86,775
S43	TI (crustacea* or shellfish* or (shell W0 fish*)) OR AB (crustacea* or shellfish* or (shell W0 fish*))	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	629

S42	(MH "Shellfish")	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	432
S41	(MH "Crustacea")	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	350
S40	TI (mollusc* or mollusk*) OR AB (mollusc* or mollusk*)	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	531
S39	(MH "Mollusca")	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database -	491

			CINAHL Plus with Full Text	
S38	TI (aquacultur* or (aqua W0 cultur*) or aquafarm* or (aqua W0 farm*) or (aquatic W0 farm*) or aquiculture* or (aqui W0 culture*) or fisheries or fishery or fishfarm* or (fish* N3 farm*) or fishhatcher* or (fish W0 hatcher*) or finfish* or (fin W0 fish*) or (finned W0 fish*) or pisciculture* or (pisci W0 culture*)) OR AB (aquacultur* or (aqua W0 cultur*) or aquafarm* or (aqua W0 farm*) or (aquatic W0 farm*) or aquiculture* or (aqui W0 culture*) or fisheries or fishery or fishfarm* or (fish* N3 farm*) or fishhatcher* or (fish W0 hatcher*) or finfish* or (fin W0 fish*) or (finned W0 fish*) or pisciculture* or (pisci W0 culture*))	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	667
S37	TI (hare or hares or leporidae or rabbit or rabbits) OR AB (hare or hares or leporidae or rabbit or rabbits)	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	9,646
S36	(MH "Rabbits")	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	8,719
S35	TI (quail or quails or colinus or coturnix or (bob W0 white#) or bobwhite#) OR AB (quail or quails or colinus or coturnix or (bob W0 white#) or bobwhite#)	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases	105

			Search Screen - Advanced Search Database - CINAHL Plus with Full Text	
S34	TI (palaeognath* or ratite#) OR AB (palaeognath* or ratite#)	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	3
S33	TI (poultry or poultries or (domestic* N3 fowl#) or chicken* or (domestic* N3 gallus) or "gallus gallus" or duck or ducks or geese or goose or turkey or turkeys or meleagridi*) OR AB (poultry or poultries or (domestic* N3 fowl#) or chicken* or (domestic* N3 gallus) or "gallus gallus" or duck or ducks or geese or goose or turkey or turkeys or meleagridi*)	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	20,021
S32	(MH "Poultry")	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	3,696
S31	TI (partridge# or perdicine# or pavo or pavos or peacock# or (pea W0 cock#) or peafowl# or	Search modes - Find all my search terms	Interface - EBSCOhost	188

	(pea W0 fowl#) or (pea W0 hen#) or peahen# or pheasant#) OR AB (partridge# or perdicine# or pavo or pavos or peacock# or (pea W0 cock#) or peafowl# or (pea W0 fowl#) or (pea W0 hen#) or peahen# or pheasant#)		Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	
S30	TI (guinea W0 fowl#) or guineafowl# or (guinea W0 hen#) or guineahen# or numididae) OR AB ((guinea W0 fowl#) or guineafowl# or (guinea W0 hen#) or guineahen# or numididae)	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	10
S29	TI (grouse# or tetraoni*) OR AB (grouse# or tetraoni*)	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	20
S28	TI (deer or deers or cervid*) OR AB (deer or deers or cervid*)	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	491

S27	TI (columbidae or "columba livia" or pigeon#) OR AB (columbidae or "columba livia" or pigeon#)	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	250
S26	(MH "Pigeons")	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	9
S25	TI (apiary or apiaries or apiculture* or apiculture* or apoidea or bee or bees or beekeep*) OR AB (apiary or apiaries or apiculture* or api-culture* or apoidea or bee or bees or beekeep*)	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	1,532
S24	TI (camelid# N3 (new world or america*)) OR AB (camelid# N3 (new world or america*))	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database -	3

			CINAHL Plus with Full Text	
S23	TI (alpaca* or guanaco* or lama or lamas or llama# or vicuna#) OR AB (alpaca* or guanaco* or lama or lamas or llama# or vicuna#)	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	455
S22	TI bison# or bubalu* or buffalo* or syncerus OR AB bison# or bubalu* or buffalo* or syncerus	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	788
S21	TI (boar or boars or gilt or gilts or hog or hogs or pig or pigs or piglet? or sow or sows or suidae or (sus N2 domestic*) or swine#) OR AB (boar or boars or gilt or gilts or hog or hogs or pig or pigs or piglet? or sow or sows or suidae or (sus N2 domestic*) or swine#)	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	14,271
S20	(MH "Swine")	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced	14,212

			Search Database - CINAHL Plus with Full Text	
S19	TI (sheep or ewe or ewes or ram or rams or tup or tups or (ovis N2 aries)) OR AB (sheep or ewe or ewes or ram or rams or tup or tups or (ovis N2 aries))	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	4,642
S18	(MH "Sheep")	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	4,045
S17	TI (equus N3 (caballus or domestic* or przewalskii)) OR AB (equus N3 (caballus or domestic* or przewalskii))	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	11
S16	TI (horse or horses) OR AB (horse or horses)	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search	2,326

			Screen - Advanced Search Database - CINAHL Plus with Full Text	
S15	(MH "Horses")	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	1,273
S14	TI (goat or goats or capra or capras) OR AB (goat or goats or capra or capras)	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	1,366
S13	(MH "Goats")	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	142
S12	TI dairy N3 herd# OR AB dairy N3 herd#	Search modes - Find all my search terms	Interface - EBSCOhost Research	78

			Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	
S11	TI (cattle or cow or cows or calf or calves) OR AB (cattle or cow or cows or calf or calves)	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	8,091
S10	(MH "Cattle")	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	6,343
S9	TI dairy* N3 farm* OR AB dairy* N3 farm*	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	320

S8	TI animal# N3 farm* OR AB animal# N3 farm*	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	461
S7	TI (livestock# or "live stock" or "live stocks") OR AB (livestock# or "live stock" or "live stocks")	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	1,540
S6	(MH "Agriculture")	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	8,080
S5	S1 OR S2 OR S3 OR S4	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database -	2,429

			CINAHL Plus with Full Text	
S4	TI "clade 2.3.4.4b" OR AB "clade 2.3.4.4b"	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	35
S3	TI ((avian or bird#) N3 (flu or flus or influenza*)) OR AB ((avian or bird#) N3 (flu or flus or influenza*))	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	1,951
S2	TI (H5N1 or HPAI) OR AB (H5N1 or HPAI)	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	818
S1	(MH "Influenza A H5N1") OR (MH "Influenza A Virus, H5N1 Subtype")	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced	742

			Search Database - CINAHL Plus with Full Text	
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CAB Abstracts

#	Query	Limiters/Expanders	Last Run Via	Results
S77	S75 OR S76	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	822
S76	S61 AND S72	Limiters - Publication Year: 20200101-20241231 Narrow by Language: - french Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	3
S75	S61 AND S72	Limiters - Publication Year: 20200101-20241231 Narrow by Language: - english Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	819
S74	S61 AND S72	Limiters - Publication Year: 20200101-20241231	Interface - EBSCOhost Research Databases	912

		Search modes - Find all my search terms	Search Screen - Advanced Search Database - CAB Abstracts	
S73	S61 AND S72	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	4,702
S72	S62 OR S63 OR S64 OR S65 OR S66 OR S67 OR S68 OR S69 OR S70 OR S71	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	2,606,416
S71	TI ((environment* or occupation* or work* or employee# or individual# or labo#r* or people or personnel or person# or staff or worker# or workforce#) N3 (expos* or infect*)) OR AB ((environment* or occupation* or work* or employee# or individual# or labo#r* or people or personnel or person# or staff or worker# or workforce#) N3 (expos* or infect*))	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	80,697
S70	DE "exposure"	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen -	64,202

			Advanced Search Database - CAB Abstracts	
S69	TI (hunter# or trapper#) OR AB (hunter# or trapper#)	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	8,220
S68	TI ((food# or meat# or meatpack* or meatprocess* or milk or milking or slaughter*) N3 (employee# or force or forces or handler# or labo#r* or people or personnel or person# or staff or worker# or workforce#)) OR AB ((food# or meat# or meatpack* or meatprocess* or milk or milking or slaughter*) N3 (employee# or force or forces or handler# or labo#r* or people or personnel or person# or staff or worker# or workforce#))	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	20,543
S67	TI (dairyfarmer# or dairyworker# or farmer# or farmhand* or farmworker#) OR AB (dairyfarmer# or dairyworker# or farmer# or farmhand* or farmworker#)	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	243,703
S66	TI ((agricultur* or dairy* or farm*) N3 (employee# or force or forces or individual# or labo#r* or people or personnel or person# or staff or worker# or workforce#)) OR AB ((agricultur* or dairy* or farm*) N3 (employee# or force or forces or individual# or labo#r* or people or personnel or person# or staff or worker# or workforce#))	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	49,843

			Database - CAB Abstracts	
S65	DE "farm families"	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	1,628
S64	DE "farmers"	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	53,097
S63	TI (human or humans or people or person# or people or child* or boy or boys or girl or girls or man or men or wom?n) OR AB (human or humans or people or person# or people or child* or boy or boys or girl or girls or man or men or wom?n)	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	1,514,673
S62	DE "man"	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	1,702,232

S61	S4 AND S60	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	11,690
S60	S5 OR S6 OR S7 OR S8 OR S9 OR S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26 OR S27 OR S28 OR S29 OR S30 OR S31 OR S32 OR S33 OR S34 OR S35 OR S36 OR S37 OR S38 OR S39 OR S40 OR S41 OR S42 OR S43 OR S44 OR S45 OR S46 OR S47 OR S48 OR S49 OR S50 OR S51 OR S52 OR S53 OR S54 OR S55 OR S56 OR S57 OR S58 OR S59	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	2,214,204
S59	TI (crustacea* or shellfish* or (shell W0 fish*) OR AB (crustacea* or shellfish* or (shell W0 fish*))	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	25,198
S58	DE "shellfish" OR DE "shellfish culture" OR DE "shellfish fisheries"	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	76,565
S57	DE "crustacean culture"	Search modes - Find all my search terms	Interface - EBSCOhost	265

			Research Databases Search Screen - Advanced Search Database - CAB Abstracts	
S56	DE "Crustacea"	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	80,144
S55	TI (mollusc* or mollusk*) OR AB (mollusc* or mollusk*)	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	17,719
S54	DE "Mollusca"	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	72,405
S53	TI (aquacultur* or (aqua W0 cultur*) or aquafarm* or (aqua W0 farm*) or (aquatic W0 farm*) or aquiculture* or (aqui W0 culture*) or fisheries or fishery or fishfarm* or (fish* N3	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases	96,772

	farm*) or fishhatcher* or (fish W0 hatcher*) or finfish* or (fin W0 fish*) or (finned W0 fish*) or pisciculture* or (pisci W0 culture*)) OR AB (aquacultur* or (aqua W0 cultur*) or aquafarm* or (aqua W0 farm*) or (aquatic W0 farm*) or aquiculture* or (aqui W0 culture*) or fisheries or fishery or fishfarm* or (fish* N3 farm*) or fishhatcher* or (fish W0 hatcher*) or finfish* or (fin W0 fish*) or (finned W0 fish*) or pisciculture* or (pisci W0 culture*))		Search Screen - Advanced Search Database - CAB Abstracts	
S52	DE "aquaculture" OR DE "brackishwater aquaculture" OR DE "freshwater aquaculture" OR DE "marine aquaculture" OR DE "shellfish culture" OR DE "fisheries"	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	102,352
S51	TI (hare or hares or leporidae or rabbit or rabbits) OR AB (hare or hares or leporidae or rabbit or rabbits)	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	76,838
S50	DE "rabbits" OR DE "Leporidae"	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	57,063
S49	TI (quail or quails or colinus or coturnix or (bob W0 white#) or bobwhite#) OR AB (quail or	Search modes - Find all my search terms	Interface - EBSCOhost	13,335

	quails or colinus or coturnix or (bob W0 white#) or bobwhite#)		Research Databases Search Screen - Advanced Search Database - CAB Abstracts	
S48	DE "quails" OR DE "Coturnix"	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	11,488
S47	TI (palaeognath* or ratite#) OR AB (palaeognath* or ratite#)	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	338
S46	TI (poultry or poultries or (domestic* N3 fowl#) or chicken* or (domestic* N3 gallus) or "gallus gallus" or duck or ducks or geese or goose or turkey or turkeys or meleagridi*) OR AB (poultry or poultries or (domestic* N3 fowl#) or chicken* or (domestic* N3 gallus) or "gallus gallus" or duck or ducks or geese or goose or turkey or turkeys or meleagridi*)	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	311,366
S45	DE "poultry" OR DE "poultry farming"	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases	284,454

			Search Screen - Advanced Search Database - CAB Abstracts	
S44	TI (partridge# or perdicine# or pavo or pavos or peacock# or (pea W0 cock#) or peafowl# or (pea W0 fowl#) or (pea W0 hen#) or peahen# or pheasant#) OR AB (partridge# or perdicine# or pavo or pavos or peacock# or (pea W0 cock#) or peafowl# or (pea W0 fowl#) or (pea W0 hen#) or peahen# or pheasant#)	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	5,925
S43	TI ((guinea W0 fowl#) or guineafowl# or (guinea W0 hen#) or guineahen# or numididae) OR AB ((guinea W0 fowl#) or guineafowl# or (guinea W0 hen#) or guineahen# or numididae)	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	2,072
S42	DE "guineafowls" OR DE "Numida"	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	1,810
S41	TI (grouse# or tetraoni*) OR AB (grouse# or tetraoni*)	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen -	1,629

			Advanced Search Database - CAB Abstracts	
S40	DE "grouse"	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	478
S39	TI (deer or deers or cervid*) OR AB (deer or deers or cervid*)	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	Display
S38	DE "deer" OR DE "Cervidae" OR DE "deer farming"	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	Display
S37	TI (columbidae or "columba livia" or pigeon#) OR AB (columbidae or "columba livia" or pigeon#)	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	Display

			Database - CAB Abstracts	
S36	DE "pigeons"	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	Display
S35	TI (apiary or apiaries or apiculture* or apiculture* or apoidea or bee or bees or beekeep*) OR AB (apiary or apiaries or apiculture* or api-culture* or apoidea or bee or bees or beekeep*)	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	Display
S34	DE "Apidae"	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	Display
S33	TI (camelid# N3 (new world or america*)) OR AB (camelid# N3 (new world or america*))	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	Display

S32	DE "Camelidae"	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	Display
S31	TI (alpaca* or guanaco* or lama or lamas or llama# or vicuna#) OR AB (alpaca* or guanaco* or lama or lamas or llama# or vicuna#)	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	Display
S30	DE "alpacas" OR DE "Lama"	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	Display
S29	TI (bubalu* or buffalo* or syncerus) OR AB (bubalu* or buffalo* or syncerus)	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	Display
S28	DE "buffaloes"	Search modes - Find all my search terms	Interface - EBSCOhost	Display

			Research Databases Search Screen - Advanced Search Database - CAB Abstracts	
S27	TI bison# OR AB bison#	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	Display
S26	DE "Bison bison"	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	Display
S25	TI (boar or boars or gilt or gilts or hog or hogs or pig or pigs or piglet# or sow or sows or suidae or (sus N2 domestic*) or swine#) OR AB (boar or boars or gilt or gilts or hog or hogs or pig or pigs or piglet# or sow or sows or suidae or (sus N2 domestic*) or swine#)	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	Display
S24	DE "pigs"	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases	Display

			Search Screen - Advanced Search Database - CAB Abstracts	
S23	TI (sheep or ewe or ewes or ram or rams or tup or tups or (ovis N2 aries)) OR AB (sheep or ewe or ewes or ram or rams or tup or tups or (ovis N2 aries))	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	Display
S22	DE "sheep"	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	Display
S21	TI (equus N3 (caballus or domestic* or przewalskii)) OR AB (equus N3 (caballus or domestic* or przewalskii))	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	Display
S20	TI (horse or horses) OR AB (horse or horses)	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen -	Display

			Advanced Search Database - CAB Abstracts	
S19	DE "horses"	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	Display
S18	TI (goat or goats or capra or capras) OR AB (goat or goats or capra or capras)	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	Display
S17	DE "goats"	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	Display
S16	TI dairy N3 herd# OR AB dairy N3 herd#	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	Display

			Database - CAB Abstracts	
S15	TI (cattle or cow or cows or calf or calves or heifer#) OR AB (cattle or cow or cows or calf or calves or heifer#)	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	Display
S14	DE "cattle" OR DE "heifers"	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	Display
S13	DE "dairy breeds"	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	Display
S12	DE "dairy cattle" OR DE "dairy bulls" OR DE "dairy cows"	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	Display

S11	DE "dairy herds"	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	Display
S10	TI dairy* N3 farm* OR AB dairy* N3 farm*	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	Display
S9	TI animal# N3 farm* OR AB animal# N3 farm*	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	Display
S8	TI (livestock# or "live stock" or "live stocks") OR AB (livestock# or "live stock" or "live stocks")	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	Display
S7	DE "livestock"	Search modes - Find all my search terms	Interface - EBSCOhost	Display

			Research Databases Search Screen - Advanced Search Database - CAB Abstracts	
S6	DE "dairy farming"	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	Display
S5	DE "farming"	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	Display
S4	S1 OR S2 OR S3	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	Display
S3	TI "clade 2.3.4.4b" OR AB "clade 2.3.4.4b"	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases	Display

			Search Screen - Advanced Search Database - CAB Abstracts	
S2	TI ((avian or bird#) N3 (flu or flus or influenza*)) OR AB ((avian or bird#) N3 (flu or flus or influenza*))	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	Display
S1	TI (H5N1 or HPAI) OR AB (H5N1 or HPAI)	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CAB Abstracts	Display

Web of Science (Core Collection)

Set

#	Search Query	Results
1	(environment* or occupation* or work* or employee* or individual or individuals or labor* or labour* or people or personnel or person or persons or staff or worker* or workforce*) NEAR/3 (expos* or infect*) (Topic)	297839
2	(food or foods or meat or meats or meatpack* or meatprocess* or milk or milking or slaughter*) NEAR/3 (employee* or force or forces or handler* or labor* or labour* or people or personnel or person or persons or staff or worker* or workforce*) (Topic) OR hunter* or trapper* (Topic)	52913
3	human or humans or people or person or persons or people or child* or boy or boys or girl or girls or man or men or woman or women (Topic) OR (agriculture* or dairy* or farm*) NEAR/3 (employee* or force or forces or individual* or labor* or labour* or people or personnel or person or	1115820
		7

	persons or staff or worker* or workforce*) (Topic) OR dairyfarmer* or dairyworker* or farmer* or farmhand* or farmworker* (Topic)	1133969
4	#1 OR #2 OR #3 hare or hares or leporidae or rabbit or rabbits (Topic) OR aquacultur* or (aqua NEAR/0 cultur*) or aquafarm* or (aqua NEAR/0 farm*) or (aquatic NEAR/0 farm*) or aquiculture* or (aqui NEAR/0 culture*) or fisheries or fishery or fishfarm* or (fish* NEAR/3 farm*) or fishhatcher* or (fish NEAR/0 hatcher*) or finfish* or (fin NEAR/0 fish*) or (finned NEAR/0 fish*) or pisciculture* or (pisci NEAR/0 culture*) (Topic) OR mollusc* or mollusk* (Topic) OR crustacea* or shellfish* or (shell NEAR/0 fish*) (Topic)	5
5	poultry or poultries or (domestic* NEAR/3 fowl*) or chicken* or (domestic* NEAR/3 gallus) or "gallus gallus" or duck or ducks or geese or goose or turkey or turkeys or meleagridi* (Topic) OR palaeognath* or ratite* (Topic) OR quail or quails or colinus or coturnix or (bob NEAR/0 white*) or bobwhite* (Topic)	652682
6	TS=(grouse* or tetraoni*) OR TS=((guinea NEAR/0 fowl*) or guineafowl* or (guinea NEAR/0 hen*) or guineahen* or numididae) OR TS=(partridge* or perdicine* or pavo or pavos or peacock* or (pea NEAR/0 cock*) or peafowl* or (pea NEAR/0 fowl*) or (pea NEAR/0 hen*) or peahen* or pheasant*)	433611
7	apiary or apiaries or apiculture* or api-culture* or apoidea or bee or bees or beekeep* (Topic) OR columbidae or "columba livia" or pigeon* (Topic)	14833
8	OR deer or deers or cervid* (Topic)	150448
9	alpaca* or guanaco* or lama or lamas or llama* or vicuna (Topic) OR camelid* NEAR/3 ("new world" or america*) (Topic)	9731
10	sheep or ewe or ewes or ram or rams or tup or tups or (ovis NEAR/2 aries) (Topic) OR boar or boars or gilt or gilts or hog or hogs or pig or pigs or piglet* or sow or sows or suidae or (sus NEAR/2 domestic*) or swine or swines (Topic) OR bison or bisons or bubalu* or buffalo* or syncerus (Topic)	765978
11	goat or goats or capra or capras (Topic) OR horse or horses (Topic) OR equus NEAR/3 (caballus or domestic* or przewalskii) (Topic)	188191
12	cattle or cow or cows or calf or calves or heifer or heifers (Topic) OR dairy NEAR/3 herd* (Topic)	415931
13	livestock* or "live stock" or "live stocks" (Topic) OR animal* NEAR/3 farm* (Topic) OR dairy* NEAR/3 farm* (Topic)	125954
14	#5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13 H5N1 or HPAI (Topic) OR (avian or bird or birds) NEAR/3 (flu or flus or influenza*) (Topic) OR "clade 2.3.4.4b" (Topic)	2470455
15	#14 AND #15	22215
16	#4 AND #16 and 2024 or 2023 or 2022 or 2021 or 2020 (Publication Years)	11144
17	and English or French (Languages)	1204

Avian Flu – Livestock
2024 Sep 12
Updated from 2024 Aug 19

Ovid Multifile

Database: Embase <1974 to 2024 September 11>, Ovid MEDLINE(R) ALL <1946 to September 11, 2024>
Search Strategy:

-
- 1 Influenza A Virus, H5N1 Subtype/ (8956)
 - 2 (H5N1 or HPAI).tw,kw,kf. (18483)
 - 3 ((avian or bird?) adj3 (flu or flus or influenza*)).tw,kw,kf. (30854)
 - 4 "clade 2.3.4.4b".tw,kw,kf. (674)
 - 5 or/1-4 [AVIAN FLU] (37880)
 - 6 Agriculture/ (114531)
 - 7 Farms/ (22263)
 - 8 Livestock/ (26419)
 - 9 (livestock? or live stock?).tw,kw,kf. (83284)
 - 10 (animal? adj3 farm*).tw,kw,kf. (19824)
 - 11 Dairying/ (25834)
 - 12 (dairy* adj3 farm*).tw,kw,kf. (19234)
 - 13 Cattle/ (601317)
 - 14 (cattle or cow or cows or calf or calves or heifer?).tw,kw,kf. (450825)
 - 15 (dairy adj3 herd?).tw,kw,kf. (13212)
 - 16 Goats/ (67080)
 - 17 (goat or goats or capra or capras).tw,kw,kf. (87491)
 - 18 Horses/ (140072)
 - 19 (horse or horses).tw,kw,kf. (137626)
 - 20 (equus adj3 (caballus or domestic* or przewalskii)).tw,kw,kf. (2272)
 - 21 Sheep/ or Sheep, Domestic/ (230071)
 - 22 (sheep or ewe or ewes or ram or rams or tup or tups or (ovis adj2 aries)).tw,kw,kf. (241223)
 - 23 exp Swine/ (350157)
 - 24 (boar or boars or gilt or gilts or hog or hogs or pig or pigs or piglet? or sow or sows or suidae or (sus adj2 domestic*) or swine?).tw,kw,kf. (612907)
 - 25 Bees/ (27875)
 - 26 (apiary or apiaries or apiculture* or api-culture* or apoidea or bee or bees or beekeep*).tw,kw,kf. (48934)
 - 27 Bison/ (1486)
 - 28 bison?.tw,kw,kf. (2944)
 - 29 Buffaloes/ (16558)
 - 30 (bubalu* or buffalo* or syncerus).tw,kw,kf. (28947)
 - 31 Camelids, New World/ (2985)
 - 32 (alpaca* or guanaco* or lama or lamas or llama? or vicuna?).tw,kw,kf. (12282)
 - 33 (camelid? adj3 (new world or america*)).tw,kw,kf. (967)
 - 34 Columbidae/ (14867)
 - 35 (columbidae or columba livia or pigeon?).tw,kw,kf. (28363)
 - 36 exp Deer/ (26856)

- 37 (deer or deers or cervid*).tw,kw,kf. (29464)
- 38 (grouse? or tetraoni*).tw,kw,kf. (1268)
- 39 (guinea fowl? or guineafowl? or guinea hen? or guineahen? or numididae).tw,kw,kf. (1378)
- 40 (partridge? or perdicine? or pavo or pavos or peacock? or pea cock? or peafowl? or pea fowl? or pea hen? or peahen? or pheasant?).tw,kw,kf. (6041)
- 41 exp Poultry/ (200924)
- 42 (poultry or poultries or (domestic* adj3 fowl?) or chicken* or (domestic* adj3 gallus) or gallus gallus or duck or ducks or geese or goose or turkey or turkeys or meleagridi*).tw,kw,kf. (436909)
- 43 Palaeognathae/ (337)
- 44 (palaeognath* or ratite?).tw,kw,kf. (895)
- 45 exp Quail/ (18051)
- 46 (quail or quails or colinus or coturnix or bob-white? or bobwhite?).tw,kw,kf. (21071)
- 47 Rabbits/ (367955)
- 48 (hare or hares or leporidae or rabbit or rabbits).tw,kw,kf. (551547)
- 49 exp Aquaculture/ (36309)
- 50 (aquacultur* or aqua-cultur* or aquafarm* or aqua-farm* or aquatic farm* or aquiculture* or aqui-culture* or fisheries or fishery or fishfarm* or (fish* adj3 farm*) or fishhatcher* or fish hatcher* or finfish* or fin fish* or finned fish* or mariculture* or mari-culture* or pisciculture* or pisci-culture*).tw,kw,kf. (78061)
- 51 exp Mollusca/ (142786)
- 52 (mollusc* or mollusk*).tw,kw,kf. (45016)
- 53 exp Crustacea/ (113059)
- 54 (crustacea* or shellfish* or shell fish*).tw,kw,kf. (55872)
- 55 or/6-54 [LIVESTOCK, DAIRY FARMS] (3693836)
- 56 5 and 55 [H5N1 - LIVESTOCK, DAIRY FARMS] (19761)
- 57 Humans/ (42781208)
- 58 (human or humans or people or person? or people or child* or boy or boys or girl or girls or man or men or wom#n).tw,kw,kf. (17362384)
- 59 Farmers/ (34378)
- 60 ((agricultur* or dairy* or farm*) adj3 (employee? or force or forces or individual? or labo?r* or people or personnel or person? or staff or worker? or workforce?)).tw,kw,kf. (21699)
- 61 (dairyfarmer? or dairyworker? or farmer? or farmhand? or farmworker?).tw,kw,kf. (71863)
- 62 ((food? or meat? or meatpack* or meatprocess* or milk or milking or slaughter*) adj3 (employee? or force or forces or handler? or labo?r* or people or personnel or person? or staff or worker? or workforce?)).tw,kw,kf. (18407)
- 63 (hunter? or trapper?).tw,kw,kf. (23086)
- 64 Environmental Exposure/ (214353)
- 65 Occupational Exposure/ (154993)
- 66 ((environment* or occupation* or work* or employee? or individual? or labo?r* or people or personnel or person? or staff or worker? or workforce?) adj3 (expos* or infect*)).tw,kw,kf. (509865)
- 67 or/57-66 [HUMANS, DAIRY/FARM WORKERS, FOOD PROCESSING WORKERS, ETC.] (47953566)
- 68 56 and 67 [H5N1 - LIVESTOCK, DAIRY FARMS - HUMANS, DAIRY/FARM WORKERS, FOOD PROCESSING WORKERS, ETC.] (10268)
- 69 limit 68 to yr="2020-current" [DATE LIMIT APPLIED] (2290)
- 70 limit 69 to english (2253)
- 71 limit 69 to french (1)
- 72 70 or 71 [LANGUAGE LIMITS] (2254)

73 72 use medall [MEDLINE RECORDS] (1064)
74 "Influenza A virus (H5N1)"/ (9220)
75 (H5N1 or HPAI).tw,kw,kf. (18483)
76 ((avian or bird?) adj3 (flu or flus or influenza*)).tw,kw,kf. (30854)
77 "clade 2.3.4.4b".tw,kw,kf. (674)
78 or/74-77 [AVIAN FLU] (37998)
79 agriculture/ (114531)
80 agricultural land/ (16477)
81 livestock/ (26419)
82 (livestock? or live stock?).tw,kw,kf. (83284)
83 exp farm animal/ (60960)
84 (animal? adj3 farm*).tw,kw,kf. (19824)
85 dairying/ (25834)
86 (dairy* adj3 farm*).tw,kw,kf. (19234)
87 cattle/ (601317)
88 exp domestic cattle/ (15348)
89 dairy cattle/ (12162)
90 heifer/ (2379)
91 (cattle or cow or cows or calf or calves or heifer?).tw,kw,kf. (450825)
92 (dairy adj3 herd?).tw,kw,kf. (13212)
93 exp goat/ (73212)
94 (goat or goats or capra or capras).tw,kw,kf. (87491)
95 exp horse/ (153743)
96 (horse or horses).tw,kw,kf. (137626)
97 (equus adj3 (caballus or domestic* or przewalskii)).tw,kw,kf. (2272)
98 exp sheep/ (243287)
99 (sheep or ewe or ewes or ram or rams or tup or tups or (ovis adj2 aries)).tw,kw,kf. (241223)
100 exp pig/ (99991)
101 (boar or boars or gilt or gilts or hog or hogs or pig or pigs or piglet? or sow or sows or suidae or
(sus adj2 domestic*) or swine?).tw,kw,kf. (612907)
102 exp bee/ (38613)
103 (apiary or apiaries or apiculture* or api-culture* or apoidea or bee or bees or beekeep*).tw,kw,kf.
(48934)
104 exp bison/ (1709)
105 bison?.tw,kw,kf. (2944)
106 water buffalo/ (9032)
107 (bubalu* or buffalo* or syncerus).tw,kw,kf. (28947)
108 exp New World camelid/ (4708)
109 alpaca/ (3568)
110 (alpaca* or guanaco* or lama or lamas or llama? or vicuna?).tw,kw,kf. (12282)
111 exp New World camelid/ (4708)
112 (camelid? adj3 (new world or america*)).tw,kw,kf. (967)
113 exp columbidae/ (15768)
114 (columbidae or columba livia or pigeon?).tw,kw,kf. (28363)
115 exp deer/ (26856)
116 (deer or deers or cervid*).tw,kw,kf. (29464)
117 exp grouse/ (176)

- 118 (grouse? or tetraoni*).tw,kw,kf. (1268)
- 119 exp guineafowl/ (202)
- 120 (guinea fowl? or guineafowl? or guinea hen? or guineahen? or numididae).tw,kw,kf. (1378)
- 121 exp phasianinae/ or exp perdicinae/ (27448)
- 122 (partridge? or perdicine? or pavo or pavos or peacock? or pea cock? or peafowl? or pea fowl? or pea hen? or peahen? or pheasant?).tw,kw,kf. (6041)
- 123 exp poultry/ (200924)
- 124 (poultry or poultries or (domestic* adj3 fowl?) or chicken* or (domestic* adj3 gallus) or gallus gallus or duck or ducks or geese or goose or turkey or turkeys or meleagridi*).tw,kw,kf. (436909)
- 125 exp ratite/ (3187)
- 126 (palaeognath* or ratite?).tw,kw,kf. (895)
- 127 exp quail/ (18051)
- 128 (quail or quails or colinus or coturnix or bob-white? or bobwhite?).tw,kw,kf. (21071)
- 129 exp leporidae/ (391517)
- 130 (hare or hares or leporidae or rabbit or rabbits).tw,kw,kf. (551547)
- 131 aquaculture/ (25594)
- 132 exp mariculture/ (630)
- 133 exp pisciculture/ (2154)
- 134 (aquacultur* or aqua-cultur* or aquafarm* or aqua-farm* or aquatic farm* or aquiculture* or aqui-culture* or fisheries or fishery or fishfarm* or (fish* adj3 farm*) or fishhatcher* or fish hatcher* or finfish* or fin fish* or finned fish* or mariculture* or mari-culture* or pisciculture* or pisci-culture*).tw,kw,kf. (78061)
- 135 exp crustacea/ (113059)
- 136 (crustacea* or shellfish* or shell fish*).tw,kw,kf. (55872)
- 137 exp mollusc/ (142786)
- 138 (mollusc* or mollusk*).tw,kw,kf. (45016)
- 139 exp shellfish farming/ (302)
- 140 or/79-139 [LIVESTOCK, DAIRY FARMS] (3652849)
- 141 78 and 140 [H5N1 - LIVESTOCK, DAIRY FARMS] (19835)
- 142 exp human/ (49289421)
- 143 (human or humans or people or person? or people or child* or boy or boys or girl or girls or man or men or wom#n).tw,kw,kf. (17362384)
- 144 agricultural worker/ (34378)
- 145 ((agricultur* or dairy* or farm*) adj3 (employee? or force or forces or individual? or labo?r* or people or personnel or person? or staff or worker? or workforce?)).tw,kw,kf. (21699)
- 146 (dairyfarmer? or dairyworker? or farmer? or farmhand* or farmworker?).tw,kw,kf. (71863)
- 147 ((food? or meat? or meatpack* or meatprocess* or milk or milking or slaughter*) adj3 (employee? or force or forces or handler? or labo?r* or people or personnel or person? or staff or worker? or workforce?)).tw,kw,kf. (18407)
- 148 (hunter? or trapper?).tw,kw,kf. (23086)
- 149 exposure/ (186190)
- 150 environmental exposure/ (214353)
- 151 occupational exposure/ (154993)
- 152 ((environment* or occupation* or work* or employee? or individual? or labo?r* or people or personnel or person? or staff or worker? or workforce?) adj3 (expos* or infect*)).tw,kw,kf. (509865)
- 153 or/142-152 [HUMANS, DAIRY/FARM WORKERS, FOOD PROCESSING WORKERS, ETC.] (52233198)

154 141 and 153 [H5N1 - LIVESTOCK, DAIRY FARMS - HUMANS, DAIRY/FARM WORKERS, FOOD PROCESSING WORKERS, ETC.] (10561)
 155 limit 154 to yr="2020-current" [DATE LIMIT APPLIED] (2301)
 156 limit 155 to english (2264)
 157 limit 155 to french (1)
 158 156 or 157 [LANGUAGE LIMITS] (2265)
 159 158 use oemezd [EMBASE RECORDS] (1206)
 160 73 or 159 [BOTH DATABASES] (2270)
 161 (20240815* or 20240816* or 20240817* or 20240818* or 20240819* or 2024082* or 2024083* or 202409*).dc,dt. (287661)
 162 160 and 161 [UPDATE PERIOD] (52)
 163 remove duplicates from 162 (38) [TOTAL UNIQUE RECORDS]
 164 163 use medall [MEDLINE UNIQUE RECORDS] (15)
 165 163 use oemezd [EMBASE UNIQUE RECORDS] (23)

CINAHL

#	Query	Limiters/Expanders	Last Run Via	Results	
S62	S60 AND S61	Search modes -	Find all my search terms		Interface - EBSCOhost Research Databases
		Search Screen - Advanced Search			
		Database - CINAHL Plus with Full Text	0		
S61	EM 20240810-20240930	Search modes -	Find all my search terms		Interface - EBSCOhost Research Databases
		Search Screen - Advanced Search			
		Database - CINAHL Plus with Full Text	20,098		
S60	S57 AND S58	Limiters - Publication Date: 20200101-20241231			
		Search modes - Find all my search terms			Interface - EBSCOhost Research Databases
		Search Screen - Advanced Search			
		Database - CINAHL Plus with Full Text	54		
S59	S57 AND S58	Search modes -	Find all my search terms		Interface - EBSCOhost Research Databases
		Search Screen - Advanced Search			
		Database - CINAHL Plus with Full Text	459		
S58	LA English OR LA French	Search modes -	Find all my search terms		Interface - EBSCOhost Research Databases
		Search Screen - Advanced Search			
		Database - CINAHL Plus with Full Text	8,820,795		
S57	S45 AND S56	Search modes -	Find all my search terms		Interface - EBSCOhost Research Databases
		Search Screen - Advanced Search			
		Database - CINAHL Plus with Full Text	463		
S56	S46 OR S47 OR S48 OR S49 OR S50 OR S51 OR S52 OR S53 OR S54 OR S55	Search modes -	Find all my search terms		Interface - EBSCOhost Research Databases
		Search Screen - Advanced Search			
		Database - CINAHL Plus with Full Text	3,640,863		

S55 TI ((environment* or occupation* or work* or employee# or individual# or labo#r* or people or personnel or person# or staff or worker# or workforce#) N3 (expos* or infect*)) OR AB ((environment* or occupation* or work* or employee# or individual# or labo#r* or people or personnel or person# or staff or worker# or workforce#) N3 (expos* or infect*)) Search modes - Find all my search terms
Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL Plus with Full Text 47,025

S54 MH "Occupational Exposure" Search modes - Find all my search terms Interface -
EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL Plus with Full Text 21,590

S53 MH "Environmental Exposure" Search modes - Find all my search terms Interface -
EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL Plus with Full Text 20,404

S52 TI (hunter# or trapper#) OR AB (hunter# or trapper#) Search modes - Find all my search terms
Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL Plus with Full Text 1,406

S51 TI ((food# or meat# or meatpack* or meatprocess* or milk or milking or slaughter*) N3 (employee# or force or forces or handler# or labo#r* or people or personnel or person# or staff or worker# or workforce#)) OR AB ((food# or meat# or meatpack* or meatprocess* or milk or milking or slaughter*) N3 (employee# or force or forces or handler# or labo#r* or people or personnel or person# or staff or worker# or workforce#)) Search modes - Find all my search terms Interface -
EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL Plus with Full Text 3,045

S50 TI (dairyfarmer# or dairyworker# or farmer# or farmhand* or farmworker#) OR AB (dairyfarmer# or dairyworker# or farmer# or farmhand* or farmworker#) Search modes - Find all my search terms Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL Plus with Full Text 4,520

S49 TI ((agricultur* or dairy* or farm*) N3 (employee# or force or forces or individual# or labo#r* or people or personnel or person# or staff or worker# or workforce#)) OR AB ((agricultur* or dairy* or farm*) N3 (employee# or force or forces or individual# or labo#r* or people or personnel or person# or staff or worker# or workforce#)) Search modes - Find all my search terms Interface -
EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL Plus with Full Text 2,113

S48 MH "Farmworkers" Search modes - Find all my search terms Interface - EBSCOhost
Research Databases
Search Screen - Advanced Search
Database - CINAHL Plus with Full Text 4,086

S47 TI (human or humans or people or person# or people or child* or boy or boys or girl or girls or man or men or wom?n) OR AB (human or humans or people or person# or people or child* or boy or boys or girl or girls or man or men or wom?n) Search modes - Find all my search terms
Interface - EBSCOhost Research Databases

Search Screen - Advanced Search
Database - CINAHL Plus with Full Text 1,781,846
S46 MH "Human" Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search
Database - CINAHL Plus with Full Text 2,813,833
S45 S5 AND S44 Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search
Database - CINAHL Plus with Full Text 832
S44 S6 OR S7 OR S8 OR S9 OR S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26 OR S27 OR S28 OR S29 OR S30 OR S31 OR S32 OR S33 OR S34 OR S35 OR S36 OR S37 OR S38 OR S39 OR S40 OR S41 OR S42 OR S43 Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search
Database - CINAHL Plus with Full Text 86,886
S43 TI (crustacea* or shellfish* or (shell WO fish*)) OR AB (crustacea* or shellfish* or (shell WO fish*)) Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search
Database - CINAHL Plus with Full Text 631
S42 (MH "Shellfish") Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search
Database - CINAHL Plus with Full Text 434
S41 (MH "Crustacea") Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search
Database - CINAHL Plus with Full Text 352
S40 TI (mollusc* or mollusk*) OR AB (mollusc* or mollusk*) Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search
Database - CINAHL Plus with Full Text 532
S39 (MH "Mollusca") Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search
Database - CINAHL Plus with Full Text 491
S38 TI (aquacultur* or (aqua WO cultur*) or aquafarm* or (aqua WO farm*) or (aquatic WO farm*) or aquiculture* or (aqui WO culture*) or fisheries or fishery or fishfarm* or (fish* N3 farm*) or fishhatcher* or (fish WO hatcher*) or finfish* or (fin WO fish*) or (finned WO fish*) or pisciculture* or (pisci WO culture*)) OR AB (aquacultur* or (aqua WO cultur*) or aquafarm* or (aqua WO farm*) or (aquatic WO farm*) or aquiculture* or (aqui WO culture*) or fisheries or fishery or fishfarm* or (fish* N3 farm*) or fishhatcher* or (fish WO hatcher*) or finfish* or (fin WO fish*) or (finned WO fish*) or pisciculture* or (pisci WO culture*)) Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search
Database - CINAHL Plus with Full Text 667

S37 TI (hare or hares or leporidae or rabbit or rabbits) OR AB (hare or hares or leporidae or rabbit or rabbits) Search modes - Find all my search terms Interface - EBSCOhost Research Databases
 Search Screen - Advanced Search
 Database - CINAHL Plus with Full Text 9,652

S36 (MH "Rabbits") Search modes - Find all my search terms Interface - EBSCOhost Research Databases
 Search Screen - Advanced Search
 Database - CINAHL Plus with Full Text 8,727

S35 TI (quail or quails or colinus or coturnix or (bob W0 white#) or bobwhite#) OR AB (quail or quails or colinus or coturnix or (bob W0 white#) or bobwhite#) Search modes - Find all my search terms Interface - EBSCOhost Research Databases
 Search Screen - Advanced Search
 Database - CINAHL Plus with Full Text 105

S34 TI (palaeognath* or ratite#) OR AB (palaeognath* or ratite#) Search modes - Find all my search terms Interface - EBSCOhost Research Databases
 Search Screen - Advanced Search
 Database - CINAHL Plus with Full Text 3

S33 TI (poultry or poultries or (domestic* N3 fowl#) or chicken* or (domestic* N3 gallus) or "gallus gallus" or duck or ducks or geese or goose or turkey or turkeys or meleagridi*) OR AB (poultry or poultries or (domestic* N3 fowl#) or chicken* or (domestic* N3 gallus) or "gallus gallus" or duck or ducks or geese or goose or turkey or turkeys or meleagridi*) Search modes - Find all my search terms Interface - EBSCOhost Research Databases
 Search Screen - Advanced Search
 Database - CINAHL Plus with Full Text 20,049

S32 (MH "Poultry") Search modes - Find all my search terms Interface - EBSCOhost Research Databases
 Search Screen - Advanced Search
 Database - CINAHL Plus with Full Text 3,700

S31 TI (partridge# or perdicine# or pavo or pavos or peacock# or (pea W0 cock#) or peafowl# or (pea W0 fowl#) or (pea W0 hen#) or peahen# or pheasant#) OR AB (partridge# or perdicine# or pavo or pavos or peacock# or (pea W0 cock#) or peafowl# or (pea W0 fowl#) or (pea W0 hen#) or peahen# or pheasant#) Search modes - Find all my search terms Interface - EBSCOhost Research Databases
 Search Screen - Advanced Search
 Database - CINAHL Plus with Full Text 187

S30 TI ((guinea W0 fowl#) or guineafowl# or (guinea W0 hen#) or guineahen# or numididae) OR AB ((guinea W0 fowl#) or guineafowl# or (guinea W0 hen#) or guineahen# or numididae) Search modes - Find all my search terms Interface - EBSCOhost Research Databases
 Search Screen - Advanced Search
 Database - CINAHL Plus with Full Text 10

S29 TI (grouse# or tetraoni*) OR AB (grouse# or tetraoni*) Search modes - Find all my search terms Interface - EBSCOhost Research Databases
 Search Screen - Advanced Search
 Database - CINAHL Plus with Full Text 20

S28 TI (deer or deers or cervid*) OR AB (deer or deers or cervid*) Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search
Database - CINAHL Plus with Full Text 491
S27 TI (columbidae or "columba livia" or pigeon#) OR AB (columbidae or "columba livia" or pigeon#) Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search
Database - CINAHL Plus with Full Text 250
S26 (MH "Pigeons") Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search
Database - CINAHL Plus with Full Text 9
S25 TI (apiary or apiaries or apiculture* or api-culture* or apoidea or bee or bees or beekeep*) OR AB (apiary or apiaries or apiculture* or api-culture* or apoidea or bee or bees or beekeep*) Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search
Database - CINAHL Plus with Full Text 1,535
S24 TI (camelid# N3 (new world or america*)) OR AB (camelid# N3 (new world or america*)) Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search
Database - CINAHL Plus with Full Text 3
S23 TI (alpaca* or guanaco* or lama or lamas or llama# or vicuna#) OR AB (alpaca* or guanaco* or lama or lamas or llama# or vicuna#) Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search
Database - CINAHL Plus with Full Text 466
S22 TI bison# or bubalu* or buffalo* or syncerus OR AB bison# or bubalu* or buffalo* or syncerus Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search
Database - CINAHL Plus with Full Text 790
S21 TI (boar or boars or gilt or gilts or hog or hogs or pig or pigs or piglet? or sow or sows or suidae or (sus N2 domestic*) or swine#) OR AB (boar or boars or gilt or gilts or hog or hogs or pig or pigs or piglet? or sow or sows or suidae or (sus N2 domestic*) or swine#) Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search
Database - CINAHL Plus with Full Text 14,283
S20 (MH "Swine") Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search
Database - CINAHL Plus with Full Text 14,223
S19 TI (sheep or ewe or ewes or ram or rams or tup or tups or (ovis N2 aries)) OR AB (sheep or ewe or ewes or ram or rams or tup or tups or (ovis N2 aries)) Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search
Database - CINAHL Plus with Full Text 4,656
S18 (MH "Sheep") Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search
Database - CINAHL Plus with Full Text 4,044

S17 TI (equus N3 (caballus or domestic* or przewalskii)) OR AB (equus N3 (caballus or domestic* or przewalskii)) Search modes - Find all my search terms Interface - EBSCOhost Research Databases
 Search Screen - Advanced Search
 Database - CINAHL Plus with Full Text 11

S16 TI (horse or horses) OR AB (horse or horses) Search modes - Find all my search terms Interface - EBSCOhost Research Databases
 Search Screen - Advanced Search
 Database - CINAHL Plus with Full Text 2,329

S15 (MH "Horses") Search modes - Find all my search terms Interface - EBSCOhost Research Databases
 Search Screen - Advanced Search
 Database - CINAHL Plus with Full Text 1,277

S14 TI (goat or goats or capra or capras) OR AB (goat or goats or capra or capras) Search modes - Find all my search terms Interface - EBSCOhost Research Databases
 Search Screen - Advanced Search
 Database - CINAHL Plus with Full Text 1,369

S13 (MH "Goats") Search modes - Find all my search terms Interface - EBSCOhost Research Databases
 Search Screen - Advanced Search
 Database - CINAHL Plus with Full Text 143

S12 TI dairy N3 herd# OR AB dairy N3 herd# Search modes - Find all my search terms Interface - EBSCOhost Research Databases
 Search Screen - Advanced Search
 Database - CINAHL Plus with Full Text 77

S11 TI (cattle or cow or cows or calf or calves) OR AB (cattle or cow or cows or calf or calves) Search modes - Find all my search terms Interface - EBSCOhost Research Databases
 Search Screen - Advanced Search
 Database - CINAHL Plus with Full Text 8,104

S10 (MH "Cattle") Search modes - Find all my search terms Interface - EBSCOhost Research Databases
 Search Screen - Advanced Search
 Database - CINAHL Plus with Full Text 6,351

S9 TI dairy* N3 farm* OR AB dairy* N3 farm* Search modes - Find all my search terms Interface - EBSCOhost Research Databases
 Search Screen - Advanced Search
 Database - CINAHL Plus with Full Text 320

S8 TI animal# N3 farm* OR AB animal# N3 farm* Search modes - Find all my search terms Interface - EBSCOhost Research Databases
 Search Screen - Advanced Search
 Database - CINAHL Plus with Full Text 462

S7 TI (livestock# or "live stock" or "live stocks") OR AB (livestock# or "live stock" or "live stocks") Search modes - Find all my search terms Interface - EBSCOhost Research Databases
 Search Screen - Advanced Search
 Database - CINAHL Plus with Full Text 1,542

S6 (MH "Agriculture") Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search
Database - CINAHL Plus with Full Text 8,072
S5 S1 OR S2 OR S3 OR S4 Search modes - Find all my search terms Interface - EBSCOhost
Research Databases

Search Screen - Advanced Search
Database - CINAHL Plus with Full Text 2,440
S4 TI "clade 2.3.4.4b" OR AB "clade 2.3.4.4b" Search modes - Find all my search terms
Interface - EBSCOhost Research Databases

Search Screen - Advanced Search
Database - CINAHL Plus with Full Text 35
S3 TI ((avian or bird#) N3 (flu or flus or influenza*)) OR AB ((avian or bird#) N3 (flu or flus or
influenza*)) Search modes - Find all my search terms Interface - EBSCOhost Research
Databases

Search Screen - Advanced Search
Database - CINAHL Plus with Full Text 1,960
S2 TI (H5N1 or HPAI) OR AB (H5N1 or HPAI) Search modes - Find all my search terms
Interface - EBSCOhost Research Databases

Search Screen - Advanced Search
Database - CINAHL Plus with Full Text 820
S1 (MH "Influenza A H5N1") OR (MH "Influenza A Virus, H5N1 Subtype") Search modes - Find all
my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search
Database - CINAHL Plus with Full Text 744

CAB Abstracts

#	Query	Limiters/Expanders	Last Run Via	Results
S78	S75 OR S76	Limiters - Publication Year: 20240101-20241231		
		Search modes - Find all my search terms		Interface - EBSCOhost Research Databases
		Search Screen - Advanced Search		
		Database - CAB Abstracts 88		
S77	S75 OR S76	Search modes - Find all my search terms		Interface - EBSCOhost Research Databases

		Search Screen - Advanced Search		
		Database - CAB Abstracts 948		
S76	S61 AND S72	Limiters - Publication Year: 20200101-20241231		
		Search modes - Find all my search terms		Interface - EBSCOhost Research Databases

		Search Screen - Advanced Search		
		Database - CAB Abstracts 948		
S75	S61 AND S72	Limiters - Publication Year: 20200101-20241231		
		Search modes - Find all my search terms		Interface - EBSCOhost Research Databases

		Search Screen - Advanced Search		
		Database - CAB Abstracts 948		
S74	S61 AND S72	Limiters - Publication Year: 20200101-20241231		
		Search modes - Find all my search terms		Interface - EBSCOhost Research Databases

		Search Screen - Advanced Search		
		Database - CAB Abstracts 948		

S73 S61 AND S72 Search modes - Find all my search terms Interface - EBSCOhost Research Databases
 Search Screen - Advanced Search
 Database - CAB Abstracts 4,738

S72 S62 OR S63 OR S64 OR S65 OR S66 OR S67 OR S68 OR S69 OR S70 OR S71 Search modes - Find all my search terms Interface - EBSCOhost Research Databases
 Search Screen - Advanced Search
 Database - CAB Abstracts 2,615,174

S71 TI ((environment* or occupation* or work* or employee# or individual# or labo#r* or people or personnel or person# or staff or worker# or workforce#) N3 (expos* or infect*)) OR AB ((environment* or occupation* or work* or employee# or individual# or labo#r* or people or personnel or person# or staff or worker# or workforce#) N3 (expos* or infect*)) Search modes - Find all my search terms
 Interface - EBSCOhost Research Databases
 Search Screen - Advanced Search
 Database - CAB Abstracts 81,003

S70 DE "exposure" Search modes - Find all my search terms Interface - EBSCOhost Research Databases
 Search Screen - Advanced Search
 Database - CAB Abstracts 64,719

S69 TI (hunter# or trapper#) OR AB (hunter# or trapper#) Search modes - Find all my search terms
 Interface - EBSCOhost Research Databases
 Search Screen - Advanced Search
 Database - CAB Abstracts 8,236

S68 TI ((food# or meat# or meatpack* or meatprocess* or milk or milking or slaughter*) N3 (employee# or force or forces or handler# or labo#r* or people or personnel or person# or staff or worker# or workforce#)) OR AB ((food# or meat# or meatpack* or meatprocess* or milk or milking or slaughter*) N3 (employee# or force or forces or handler# or labo#r* or people or personnel or person# or staff or worker# or workforce#)) Search modes - Find all my search terms Interface - EBSCOhost Research Databases
 Search Screen - Advanced Search
 Database - CAB Abstracts 20,625

S67 TI (dairyfarmer# or dairyworker# or farmer# or farmhand* or farmworker#) OR AB (dairyfarmer# or dairyworker# or farmer# or farmhand* or farmworker#) Search modes - Find all my search terms Interface - EBSCOhost Research Databases
 Search Screen - Advanced Search
 Database - CAB Abstracts 244,628

S66 TI ((agricultur* or dairy* or farm*) N3 (employee# or force or forces or individual# or labo#r* or people or personnel or person# or staff or worker# or workforce#)) OR AB ((agricultur* or dairy* or farm*) N3 (employee# or force or forces or individual# or labo#r* or people or personnel or person# or staff or worker# or workforce#)) Search modes - Find all my search terms Interface - EBSCOhost Research Databases
 Search Screen - Advanced Search
 Database - CAB Abstracts 49,980

S65 DE "farm families" Search modes - Find all my search terms Interface - EBSCOhost Research Databases
 Search Screen - Advanced Search
 Database - CAB Abstracts 1,628

S64 DE "farmers" Search modes - Find all my search terms Interface - EBSCOhost Research Databases
 Search Screen - Advanced Search
 Database - CAB Abstracts 53,261

S63 TI (human or humans or people or person# or people or child* or boy or boys or girl or girls or man or men or wom?n) OR AB (human or humans or people or person# or people or child* or boy or boys or girl or girls or man or men or wom?n) Search modes - Find all my search terms
 Interface - EBSCOhost Research Databases
 Search Screen - Advanced Search
 Database - CAB Abstracts 1,519,924

S62 DE "man" Search modes - Find all my search terms Interface - EBSCOhost Research Databases
 Search Screen - Advanced Search
 Database - CAB Abstracts 1,706,809

S61 S4 AND S60 Search modes - Find all my search terms Interface - EBSCOhost Research Databases
 Search Screen - Advanced Search
 Database - CAB Abstracts 11,757

S60 S5 OR S6 OR S7 OR S8 OR S9 OR S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26 OR S27 OR S28 OR S29 OR S30 OR S31 OR S32 OR S33 OR S34 OR S35 OR S36 OR S37 OR S38 OR S39 OR S40 OR S41 OR S42 OR S43 OR S44 OR S45 OR S46 OR S47 OR S48 OR S49 OR S50 OR S51 OR S52 OR S53 OR S54 OR S55 OR S56 OR S57 OR S58 OR S59 Search modes - Find all my search terms Interface - EBSCOhost Research Databases
 Search Screen - Advanced Search
 Database - CAB Abstracts 2,220,175

S59 TI (crustacea* or shellfish* or (shell W0 fish*)) OR AB (crustacea* or shellfish* or (shell W0 fish*)) Search modes - Find all my search terms Interface - EBSCOhost Research Databases
 Search Screen - Advanced Search
 Database - CAB Abstracts 25,315

S58 DE "shellfish" OR DE "shellfish culture" OR DE "shellfish fisheries" Search modes - Find all my search terms Interface - EBSCOhost Research Databases
 Search Screen - Advanced Search
 Database - CAB Abstracts 76,930

S57 DE "crustacean culture" Search modes - Find all my search terms Interface - EBSCOhost Research Databases
 Search Screen - Advanced Search
 Database - CAB Abstracts 273

S56 DE "Crustacea" Search modes - Find all my search terms Interface - EBSCOhost Research Databases
 Search Screen - Advanced Search
 Database - CAB Abstracts 80,565

S55 TI (mollusc* or mollusk*) OR AB (mollusc* or mollusk*) Search modes - Find all my search terms Interface - EBSCOhost Research Databases
 Search Screen - Advanced Search
 Database - CAB Abstracts 17,780

S54 DE "Mollusca" Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search

Database - CAB Abstracts 72,681

S53 TI (aquacultur* or (aqua W0 cultur*) or aquafarm* or (aqua W0 farm*) or (aquatic W0 farm*) or aquiculture* or (aqui W0 culture*) or fisheries or fishery or fishfarm* or (fish* N3 farm*) or fishhatcher* or (fish W0 hatcher*) or finfish* or (fin W0 fish*) or (finned W0 fish*) or pisciculture* or (pisci W0 culture*)) OR AB (aquacultur* or (aqua W0 cultur*) or aquafarm* or (aqua W0 farm*) or (aquatic W0 farm*) or aquiculture* or (aqui W0 culture*) or fisheries or fishery or fishfarm* or (fish* N3 farm*) or fishhatcher* or (fish W0 hatcher*) or finfish* or (fin W0 fish*) or (finned W0 fish*) or pisciculture* or (pisci W0 culture*)) Search modes - Find all my search terms Interface -

EBSCOhost Research Databases

Search Screen - Advanced Search

Database - CAB Abstracts 97,349

S52 DE "aquaculture" OR DE "brackishwater aquaculture" OR DE "freshwater aquaculture" OR DE "marine aquaculture" OR DE "shellfish culture" OR DE "fisheries" Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search

Database - CAB Abstracts 102,897

S51 TI (hare or hares or leporidae or rabbit or rabbits) OR AB (hare or hares or leporidae or rabbit or rabbits) Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search

Database - CAB Abstracts 76,995

S50 DE "rabbits" OR DE "Leporidae" Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search

Database - CAB Abstracts 57,201

S49 TI (quail or quails or colinus or coturnix or (bob W0 white#) or bobwhite#) OR AB (quail or quails or colinus or coturnix or (bob W0 white#) or bobwhite#) Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search

Database - CAB Abstracts 13,368

S48 DE "quails" OR DE "Coturnix" Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search

Database - CAB Abstracts 11,517

S47 TI (palaeognath* or ratite#) OR AB (palaeognath* or ratite#) Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search

Database - CAB Abstracts 339

S46 TI (poultry or poultries or (domestic* N3 fowl#) or chicken* or (domestic* N3 gallus) or "gallus gallus" or duck or ducks or geese or goose or turkey or turkeys or meleagridi*) OR AB (poultry or poultries or (domestic* N3 fowl#) or chicken* or (domestic* N3 gallus) or "gallus gallus" or duck or ducks or geese or goose or turkey or turkeys or meleagridi*) Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search

Database - CAB Abstracts 312,449

S45 DE "poultry" OR DE "poultry farming" Search modes - Find all my search terms
Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CAB Abstracts 285,323

S44 TI (partridge# or perdicine# or pavo or pavos or peacock# or (pea W0 cock#) or peafowl# or (pea W0 fowl#) or (pea W0 hen#) or peahen# or pheasant#) OR AB (partridge# or perdicine# or pavo or pavos or peacock# or (pea W0 cock#) or peafowl# or (pea W0 fowl#) or (pea W0 hen#) or peahen# or pheasant#) Search modes - Find all my search terms Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CAB Abstracts 5,946

S43 TI ((guinea W0 fowl#) or guineafowl# or (guinea W0 hen#) or guineahen# or numididae) OR AB ((guinea W0 fowl#) or guineafowl# or (guinea W0 hen#) or guineahen# or numididae) Search modes - Find all my search terms Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CAB Abstracts 2,076

S42 DE "guineafowls" OR DE "Numida" Search modes - Find all my search terms
Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CAB Abstracts 1,814

S41 TI (grouse# or tetraoni*) OR AB (grouse# or tetraoni*) Search modes - Find all my search terms Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CAB Abstracts 1,633

S40 DE "grouse" Search modes - Find all my search terms Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CAB Abstracts 479

S39 TI (deer or deers or cervid*) OR AB (deer or deers or cervid*) Search modes - Find all my search terms Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CAB Abstracts 25,524

S38 DE "deer" OR DE "Cervidae" OR DE "deer farming" Search modes - Find all my search terms
Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CAB Abstracts 30,149

S37 TI (columbidae or "columba livia" or pigeon#) OR AB (columbidae or "columba livia" or pigeon#) Search modes - Find all my search terms Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CAB Abstracts 15,495

S36 DE "pigeons" Search modes - Find all my search terms Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CAB Abstracts 7,071

S35 TI (apiary or apiaries or apiculture* or api-culture* or apoidea or bee or bees or beekeep*) OR AB (apiary or apiaries or apiculture* or api-culture* or apoidea or bee or bees or beekeep*) Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search
Database - CAB Abstracts 66,645
S34 DE "Apidae" Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search
Database - CAB Abstracts 65,200
S33 TI (camelid# N3 (new world or america*)) OR AB (camelid# N3 (new world or america*))
Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search
Database - CAB Abstracts 782
S32 DE "Camelidae" Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search
Database - CAB Abstracts 18,173
S31 TI (alpaca* or guanaco* or lama or lamas or llama# or vicuna#) OR AB (alpaca* or guanaco* or lama or lamas or llama# or vicuna#) Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search
Database - CAB Abstracts 4,789
S30 DE "alpacas" OR DE "Lama" Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search
Database - CAB Abstracts 4,291
S29 TI (bubalu* or buffalo* or syncerus) OR AB (bubalu* or buffalo* or syncerus) Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search
Database - CAB Abstracts 46,390
S28 DE "buffaloes" Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search
Database - CAB Abstracts 41,915
S27 TI bison# OR AB bison# Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search
Database - CAB Abstracts 2,571
S26 DE "Bison bison" Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search
Database - CAB Abstracts 634
S25 TI (boar or boars or gilt or gilts or hog or hogs or pig or pigs or piglet# or sow or sows or suidae or (sus N2 domestic*) or swine#) OR AB (boar or boars or gilt or gilts or hog or hogs or pig or pigs or piglet# or sow or sows or suidae or (sus N2 domestic*) or swine#) Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search
Database - CAB Abstracts 277,824
S24 DE "pigs" Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search

Database - CAB Abstracts 254,074

S23 TI (sheep or ewe or ewes or ram or rams or tup or tups or (ovis N2 aries)) OR AB (sheep or ewe or ewes or ram or rams or tup or tups or (ovis N2 aries)) Search modes - Find all my search terms
Interface - EBSCOhost Research Databases

Search Screen - Advanced Search

Database - CAB Abstracts 194,093

S22 DE "sheep" Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search

Database - CAB Abstracts 206,467

S21 TI (equus N3 (caballus or domestic* or przewalskii)) OR AB (equus N3 (caballus or domestic* or przewalskii)) Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search

Database - CAB Abstracts 1,512

S20 TI (horse or horses) OR AB (horse or horses) Search modes - Find all my search terms
Interface - EBSCOhost Research Databases

Search Screen - Advanced Search

Database - CAB Abstracts 97,775

S19 DE "horses" Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search

Database - CAB Abstracts 129,430

S18 TI (goat or goats or capra or capras) OR AB (goat or goats or capra or capras) Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search

Database - CAB Abstracts 94,331

S17 DE "goats" Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search

Database - CAB Abstracts 91,508

S16 TI dairy N3 herd# OR AB dairy N3 herd# Search modes - Find all my search terms
Interface - EBSCOhost Research Databases

Search Screen - Advanced Search

Database - CAB Abstracts 17,870

S15 TI (cattle or cow or cows or calf or calves or heifer#) OR AB (cattle or cow or cows or calf or calves or heifer#) Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search

Database - CAB Abstracts 493,943

S14 DE "cattle" OR DE "heifers" Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search

Database - CAB Abstracts 559,231

S13 DE "dairy breeds" Search modes - Find all my search terms Interface - EBSCOhost Research Databases

Search Screen - Advanced Search
Database - CAB Abstracts 1,794
S12 DE "dairy cattle" OR DE "dairy bulls" OR DE "dairy cows" Search modes - Find all my search terms Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CAB Abstracts 100,157
S11 DE "dairy herds" Search modes - Find all my search terms Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CAB Abstracts 9,207
S10 TI dairy* N3 farm* OR AB dairy* N3 farm* Search modes - Find all my search terms Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CAB Abstracts 40,228
S9 TI animal# N3 farm* OR AB animal# N3 farm* Search modes - Find all my search terms Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CAB Abstracts 25,754
S8 TI (livestock# or "live stock" or "live stocks") OR AB (livestock# or "live stock" or "live stocks") Search modes - Find all my search terms Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CAB Abstracts 132,414
S7 DE "livestock" Search modes - Find all my search terms Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CAB Abstracts 102,627
S6 DE "dairy farming" Search modes - Find all my search terms Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CAB Abstracts 18,664
S5 DE "farming" Search modes - Find all my search terms Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CAB Abstracts 13,894
S4 S1 OR S2 OR S3 Search modes - Find all my search terms Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CAB Abstracts 15,645
S3 TI "clade 2.3.4.4b" OR AB "clade 2.3.4.4b" Search modes - Find all my search terms Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CAB Abstracts 246
S2 TI ((avian or bird#) N3 (flu or flus or influenza*)) OR AB ((avian or bird#) N3 (flu or flus or influenza*)) Search modes - Find all my search terms Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CAB Abstracts 14,723

S1 TI (H5N1 or HPAI) OR AB (H5N1 or HPAI) Search modes - Find all my search terms
 Interface - EBSCOhost Research Databases
 Search Screen - Advanced Search
 Database - CAB Abstracts 6,326

Web of Science

Set #	Search Query	Results
1	(environment* or occupation* or work* or employee* or individual or individuals or labor* or labour* or people or personnel or person or persons or staff or worker* or workforce*) NEAR/3 (expos* or infect*) (Topic)	307956
2	(food or foods or meat or meats or meatpack* or meatprocess* or milk or milking or slaughter*) NEAR/3 (employee* or force or forces or handler* or labor* or labour* or people or personnel or person or persons or staff or worker* or workforce*) (Topic) OR hunter* or trapper* (Topic)	55617
3	human or humans or people or person or persons or people or child* or boy or boys or girl or girls or man or men or woman or women (Topic) OR (agricultur* or dairy* or farm*) NEAR/3 (employee* or force or forces or individual* or labor* or labour* or people or personnel or person or persons or staff or worker* or workforce*) (Topic) OR dairyfarmer* or dairyworker* or farmer* or farmhand* or farmworker* (Topic)	11770660
4	#3 OR #2 OR #1	11958354
5	TS=(hare or hares or leporidae or rabbit or rabbits) OR TS=(aquacultur* or (aqua NEAR/0 cultur*) or aquafarm* or (aqua NEAR/0 farm*) or (aquatic NEAR/0 farm*) or aquiculture* or (aqui NEAR/0 culture*) or fisheries or fishery or fishfarm* or (fish* NEAR/3 farm*) or fishhatcher* or (fish NEAR/0 hatcher*) or finfish* or (fin NEAR/0 fish*) or (finned NEAR/0 fish*) or pisciculture* or (pisci NEAR/0 culture*)) OR TS=(mollusc* or mollusk* (Topic) OR crustacea* or shellfish* or (shell NEAR/0 fish*))	646965
6	poultry or poultries or (domestic* NEAR/3 fowl*) or chicken* or (domestic* NEAR/3 gallus) or "gallus gallus" or duck or ducks or geese or goose or turkey or turkeys or meleagridi* (Topic) OR palaeognath* or ratite* (Topic) OR quail or quails or colinus or coturnix or (bob NEAR/0 white*) or bobwhite* (Topic)	454124
7	grouse* or tetraoni* (Topic) OR (guinea NEAR/0 fowl*) or guineafowl* or (guinea NEAR/0 hen*) or guineahen* or numididae (Topic) OR partridge* or perdicine* or pavo or pavos or peacock* or (pea NEAR/0 cock*) or peafowl* or (pea NEAR/0 fowl*) or (pea NEAR/0 hen*) or peahen* or pheasant* (Topic)	15104
8	apiary or apiaries or apiculture* or api-culture* or apoidea or bee or bees or beekeep* (Topic) OR columbidae or "columba livia" or pigeon* (Topic) OR deer or deers or cervid* (Topic)	153739
9	alpaca* or guanaco* or lama or lamas or llama* or vicuna (Topic) OR camelid* NEAR/3 ("new world" or america*) (Topic)	10367
10	sheep or ewe or ewes or ram or rams or tup or tups or (ovis NEAR/2 aries) (Topic) OR boar or boars or gilt or gilts or hog or hogs or pig or pigs or piglet* or sow or sows or suidae or (sus NEAR/2 domestic*) or swine or swines (Topic) OR bison or bisons or bubalu* or buffalo* or syncerus (Topic)	779238

- 11 goat or goats or capra or capras (Topic) OR horse or horses (Topic) OR equus NEAR/3 (caballus or domestic* or przewalskii) (Topic) 193270
- 12 cattle or cow or cows or calf or calves or heifer or heifers (Topic) OR dairy near/3 herd* (Topic) 425220
- 13 livestock* or "live stock" or "live stocks" (Topic) OR animal* NEAR/3 farm* (Topic) OR dairy* NEAR/3 farm* (Topic) 131836
- 14 #13 OR #12 OR #11 OR #10 OR #9 OR #8 OR #7 OR #6 OR #5 2515040
- 15 H5N1 or HPAI (Topic) OR (avian or bird or birds) NEAR/3 (flu or flus or influenza*) (Topic) OR "clade 2.3.4.4b" (Topic) 22863
- 16 #14 AND #15 11465
- 17 #16 AND #4 5424
- 18 #16 AND #4 and 2024 (Publication Years) 193
- 19 #16 AND #4 and 2024 (Publication Years) and English (Languages) (N.B. No French records as option) 192

11.3 Appendix C. Included studies

Timeline of events	
Virus first detected	Caserta, L. C., Frye, E. A., Butt, S. L., Laverack, M., Nooruzzaman, M., Covaleda, L. M., Thompson, A. C., Koscielny, M. P., Cronk, B., & Johnson, A. (2024). Spillover of highly pathogenic avian influenza H5N1 virus to dairy cattle. <i>Nature</i> , 1-3.
Identifications of virus	<p>US Department of Agriculture, Animal and Plant Health Inspection Service (2024a). Federal and State Veterinary, Public Health Agencies Share Update on HPAI Detection in Kansas, Texas Dairy Herds https://www.aphis.usda.gov/news/agency-announcements/federal-state-veterinary-public-health-agencies-share-update-hpai.</p> <p>US Department of Agriculture, Animal and Plant Health Inspection Service (2024b). USDA, FDA and CDC Share Update on HPAI Detections in Dairy Cattle https://www.aphis.usda.gov/news/agency-announcements/usda-fda-cdc-share-update-hpai-detections-dairy-cattle.</p>
Virus detected in cats	<p>Burrough, E. R., Magstadt, D. R., Petersen, B., Timmermans, S. J., Gauger, P. C., Zhang, J., Siepker, C., Mainenti, M., Li, G., & Thompson, A. C. (2024). Highly pathogenic avian influenza A (H5N1) clade 2.3. 4.4 b virus infection in domestic dairy cattle and cats, United States, 2024. <i>Emerging infectious diseases</i>, 30(7), 1335.</p> <p>Caserta, L. C., Frye, E. A., Butt, S. L., Laverack, M., Nooruzzaman, M., Covaleda, L. M., Thompson, A. C., Koscielny, M. P., Cronk, B., & Johnson, A. (2024). Spillover of highly pathogenic avian influenza H5N1 virus to dairy cattle. <i>Nature</i>, 1-3.</p>
First confirmed human case, Texas	<p>Center for Disease Control. (2024c). Highly Pathogenic Avian Influenza A (H5N1) Virus Infection Reported in a Person in the U.S. https://www.cdc.gov/media/releases/2024/p0401-avian-flu.html#:~:text=April%201%2C%202024%E2%80%94A%20person,HPAI%20A(H5N1)%20viruses.</p> <p>Texas Department of State Health Services. (2024). DSHS Reports First Human Case of Avian Influenza in Texas https://www.dshs.texas.gov/news-alerts/dshs-reports-first-human-case-avian-influenza-texas.</p> <p>Uyeki, T. M., Milton, S., Abdul Hamid, C., Reinoso Webb, C., Presley, S. M., Shetty, V., Rollo, S. N., Martinez, D. L., Rai, S., Gonzales, E. R., Kniss, K. L., Jang, Y., Frederick, J. C., De La Cruz, J. A., Liddell, J., Di, H., Kirby, M. K., Barnes, J. R., & Davis, C. T. (2024). Highly Pathogenic Avian Influenza A(H5N1) Virus Infection in a Dairy Farm Worker. <i>The New England journal of medicine</i>, 390(21), 2028-2029. https://doi.org/https://dx.doi.org/10.1056/NEJMc2405371.</p>

<p>Second confirmed human case, Michigan</p>	<p>Garg, S., Reed, C., Davis, C. T., Uyeki, T. M., Behraves, C. B., Kniss, K., Budd, A., Biggerstaff, M., Adjemian, J., Barnes, J. R., Kirby, M. K., Basler, C., Szablewski, C. M., Richmond-Crum, M., Burns, E., Limbago, B., Daskalakis, D. C., Armstrong, K., Boucher, D., Shimabukuro, T. T., Jhung, M. A., Olsen, S. J., & Dugan, V. (2024). Outbreak of Highly Pathogenic Avian Influenza A(H5N1) Viruses in U.S. Dairy Cattle and Detection of Two Human Cases - United States, 2024. <i>MMWR. Morbidity and mortality weekly report</i>, 73(21), 501-505. https://doi.org/https://dx.doi.org/10.15585/mmwr.mm7321e1.</p> <p>Michigan Local Health, Departments Bureau of, Laboratories Bureau of Infectious Disease Prevention Investigation Team, Coyle, J., Bagdasarian, N., Eckel, S., Kuo, J., Stobierski, M. G., Barber, J., Weinberg, M., Mamou, F., & Lyon-Callo, S. (2024, //). Notes from the field: health monitoring, testing and case identification among persons exposed to influenza A (H5N1) - Michigan, 2024 [Journal Article]. <i>MMWR: Morbidity & Mortality Weekly Report</i>, 73(29), 656-658. https://doi.org/10.15585/mmwr.mm7329a4.</p> <p>Wuth, C., & Michigan Department of Health and Human Services. (2024). First case of influenza A (H5) detected in Michigan resident https://www.michigan.gov/mdhhs/inside-mdhhs/newsroom/2024/05/22/influenza-a-detection.</p>
<p>Third confirmed human case, second in Michigan</p>	<p>Center for Disease Control. (2024a). CDC Confirms Second Human H5 Bird Flu Case in Michigan; Third Case Tied to Dairy Outbreak https://www.cdc.gov/media/releases/2024/p0530-h5-human-case-michigan.html.</p> <p>Michigan Local Health, Departments Bureau of, Laboratories Bureau of Infectious Disease Prevention Investigation Team, Coyle, J., Bagdasarian, N., Eckel, S., Kuo, J., Stobierski, M. G., Barber, J., Weinberg, M., Mamou, F., & Lyon-Callo, S. (2024, //). Notes from the field: health monitoring, testing and case identification among persons exposed to influenza A (H5N1) - Michigan, 2024 [Journal Article]. <i>MMWR: Morbidity & Mortality Weekly Report</i>, 73(29), 656-658. https://doi.org/10.15585/mmwr.mm7329a4.</p>
<p>Fourth confirmed human case, Colorado</p>	<p>Center for Disease Control. (2024b). CDC Reports Fourth Human Case of H5 Bird Flu Tied to Dairy Cow Outbreak https://www.cdc.gov/media/releases/2024/p-0703-4th-human-case-h5.html.</p>
<p>Monitoring of farmworkers in Michigan</p>	<p>Michigan Local Health, Departments Bureau of, Laboratories Bureau of Infectious Disease Prevention Investigation Team, Coyle, J., Bagdasarian, N., Eckel, S., Kuo, J., Stobierski, M. G., Barber, J., Weinberg, M., Mamou, F., & Lyon-Callo, S. (2024, //). Notes from the field: health monitoring, testing and case identification among persons exposed to influenza A (H5N1) - Michigan, 2024 [Journal Article]. <i>MMWR: Morbidity & Mortality Weekly Report</i>, 73(29), 656-658. https://doi.org/10.15585/mmwr.mm7329a4.</p>
<p>Other included literature</p>	

Ahmed, Pakistan, 2024	Ahmed, A., Saqlain, S., Rasool, A., Muhammad, S., & Umar, S. (2024). Avian Influenza Virus (H5N1) Was Not Detected Among Dairy Cattle and Farm Workers in Pakistan. <i>Influenza and other respiratory viruses</i> , 18(5), e13317. https://doi.org/https://dx.doi.org/10.1111/irv.13317 .
Baker, US, 2024	Baker, A. L., Arruda, B., Palmer, M. V., Boggiatto, P., Sarlo Davila, K., Buckley, A., Ciacci Zanella, G., Snyder, C. A., Anderson, T. K., & Hutter, C. (2024). Experimental reproduction of viral replication and disease in dairy calves and lactating cows inoculated with highly pathogenic avian influenza H5N1 clade 2.3. 4.4 b. <i>bioRxiv</i> , 2024.2007. 2012.603337.
Halwe, US, 2024	Halwe, N. J., Cool, K., Breithaupt, A., Schon, J., Trujillo, J. D., Nooruzzaman, M., Kwon, T., Ahrens, A. K., Britzke, T., McDowell, C. D., Piesche, R., Singh, G., Dos Reis, V. P., Kafle, S., Pohlmann, A., Gaudreault, N. N., Corleis, B., Ferreyra, F. M., Carossino, M., Balasuriya, U. B. R., Hensley, L., Morozov, I., Covalada, L. M., Diel, D., Ulrich, L., Hoffmann, D., Beer, M., & Richt, J. A. (2024, Aug 9). Outcome of H5N1 clade 2.3.4.4b virus infection in calves and lactating cows. <i>bioRxiv</i> . https://doi.org/10.1101/2024.08.09.607272 .
US Department of Agriculture, US, 2024	US Department of Agriculture, Animal and Plant Health Inspection Service. Epidemiological Investigations of HPAI H5N1 Genotype B3.13 in Michigan Dairy Herds and Poultry Flocks: Observations on viral spread between premises and mitigation recommendations. 2024. https://www.aphis.usda.gov/sites/default/files/hpai-h5n1-dairy-cattle-mi-epi-invest.pdf .
Other relevant literature	
First A(H5N1) case in the US without a known animal exposure or occupational risk	Center for Disease Control. (2024). CDC Confirms Human H5 Bird Flu Case in Missouri https://www.cdc.gov/media/releases/2024/s0906-birdflu-case-missouri.html .
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Pan American Health Organization Risk Assessment on the spread of A(H5N1) in the Region of the Americas	Pan American Health Organization. (2024). Public Health Risk Assessment associated with the spread of zoonotic avian influenza A(H5N1) clade 2.3.4.4b in the Region of the Americas. https://www.paho.org/en/documents/public-health-risk-assessment-associated-spread-zoonotic-avian-influenza-ah5n1-clade .

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