

Centro de Documentación / Documentation Center

Objetivos/ Objectives

Identificar y atender las necesidades de información, adquisición, organización, almacenamiento, generación, uso y difusión de la información en salud pública veterinaria y proveer recursos bibliográficos técnicos-científicos al equipo de profesionales de la unidad y a los usuarios externos.

Identify and take care of the needs of information, acquisition, organization, storage, generation, use and diffusion of the information in veterinary public health and provide technical scientific bibliographical resources to the professional staff of the unit and to the users external.

Temas de interés general / Subjects of general interest



El Portal de **Preparación y Respuesta a Desastres** es un portal de información científica y técnica de la BVS (Biblioteca Virtual en Salud), con objetivo de ofrecer el acceso a una colección de fuentes de información y recursos seleccionados para apoyar el trabajo de los profesionales sanitarios y los voluntarios en la atención y hacer frente a los problemas causados como consecuencia de los desastres naturales ocurridos en Haití y Chile.

El portal incluye:

- Artículos, monografías, tesis, etc
- Recomendaciones de práctica
- Revisiones sistemáticas
- Planes de preparación
- Recursos de editoriales
- Información para el público
- Redes sociales
- Noticias y RSS

Desde la metodología de la BVS, el Portal **Preparación y Respuesta a Desastres** es de libre acceso, proporciona información actual y relevante y esencial para el mejoramiento y capacitación de recursos humanos para la toma de decisiones basadas en información y evidencia científica en política, gestión, investigación, educación, atención, prevención y control de desastres.

Portal in Spanish

<http://response.bvsalud.org/php/index.php?lang=es>

Portal in English

<http://response.bvsalud.org/php/index.php?lang=en>

Portal in Portuguese

<http://response.bvsalud.org/php/index.php?lang=pt>

Informaciones disponibles en formato electrónico / Information available in electronic format

Análisis de Sensibilidad / Sensitivity analysis

revista brasileira de **Sensitivity analysis for an unmeasured confounder: a review of two independent methods**
epidemiologia
Luiz RR, Cabral MDB
Rev bras epidemiol. 2010 June; 13 (2): 188-198

One of the main purposes of epidemiological studies is to estimate causal effects. Causal inference should be addressed by observational and experimental studies. A strong constraint for the interpretation of observational studies is the possible presence of unobserved confounders (hidden biases). An approach for assessing the possible effects of unobserved confounders may be drawn up through the use of a sensitivity analysis that determines how strong the effects of an unmeasured confounder should be to explain an apparent association, and which should be the characteristics of this confounder to exhibit such an effect. The purpose of this paper is to review and integrate two independent sensitivity analysis methods. The two methods are presented to assess the impact of an unmeasured confounder variable: one developed by Greenland under an epidemiological perspective, and the other developed from a statistical standpoint by Rosenbaum. By combining (or merging) epidemiological and statistical issues, this integration became a more complete and direct sensitivity analysis, encouraging its required diffusion and additional applications. As observational studies are more subject to biases and confounding than experimental settings, the consideration of epidemiological and statistical aspects in sensitivity analysis strengthens the causal inference.

Text in English

<http://www.scielo.br/pdf/rbepid/v13n2/02.pdf>

Especies Invasoras / Invasive Species



Defining an invasive species
Moutou F, Pastoret PP
Rev Sci Tech. 2010 Apr; 29 (1): 37-45

The definition of an invasive species will depend on the viewpoint of the observer, who in some cases may be responsible for introducing the species. History has taught us that humans are the species that has invaded the largest surface area of the planet. So, before going on to propose a few definitions, this article describes three different examples or types of example in which domestic animal species, wild animal species and microorganisms (for biological pest control) have been transported intentionally. By doing so, this paper uses a variety of situations to support the definitions. A contemporary argument would counter a strictly biogeographical definition with a more ecological definition. The two are probably complementary. In any case, these definitions should remain practical. The consequences of species movements vary. However, their health impacts should not be underestimated.

Text in English

<http://www.oie.int/boutique/extrait/04moutou1ang3746.pdf>



Livestock biodiversity

Hoffmann I

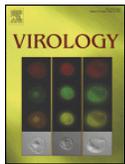
Rev Sci Tech. 2010 Apr; 29(1): 73-86

This paper describes the institutional background against which invasiveness is considered with regard to livestock genetic diversity. The human-made nature and extensive spread of a few domesticated animal species for global food production is a feature of agricultural diversity that complicates the simple, negative view of invasive species. The different impacts of livestock species on natural biodiversity, of breed diversity within species, and of within-breed diversity on agricultural biodiversity are discussed. Livestock production continues to threaten natural biodiversity. The increasing demand for food of animal origin, the productivity and technology differentials, as well as the information and awareness bias, tend to favour international high-output breeds over local breeds. This will increase their 'invasiveness' in the market economy if current policy distortions continue. Several measures are proposed to control genetic erosion through uncontrolled gene flow. Countries are responsible not only for control of invasive alien species under the Convention on Biological Diversity but also for sustainable use and conservation of animal genetic resources, and for food security; they must balance trade-offs between these broad policy objectives.

Text in English

<http://www.oie.int/boutique/extrait/08hoffmann7386.pdf>

Fiebre Aftosa / Foot-and-Mouth Disease



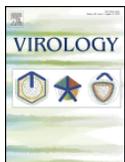
Cell density-dependent expression of viral antigens during persistence of foot-and-mouth disease virus in cell culture

Martín-Acebes MA, Herrera M, Armas-Portela R, Domingo E, Sobrino F.

Virology 2010 Jul; 403 (1): 47-55

Immunofluorescence analyses of FMDV persistently infected BHK-21 cells showed that in cultures from early stages of the persistence (passage 15) only about 10% of cells displayed viral antigens, while at late stages (passage 100) no FMDV antigen-positive cells were found. Positive cells at passage 15 displayed a number of structural alterations that did not differ from those observed in lytically infected cells. In these monolayers, and remarkably, clusters of cells that exceeded confluence were associated with an enhancement of cells positive for FMDV antigens, suggesting cell density-dependent expression of viral antigens. Inhibition of virus spread by blocking endosomal acidification, or addition of neutralizing antibodies to the culture medium reduced the number of FMDV antigen-positive cells within the monolayers. These results suggest that extracellular virus transmission plays an important role during FMDV persistence in cell culture and that this process fits the characteristics of a carrier culture model.

Text in English



Differential gene expression in bovine cells infected with wild type and leaderless foot-and-mouth disease virus

Zhu J, Weiss M, Grubman MJ, de los Santos T

Virology 2010 Aug; 404 (1): 32-40

The leader proteinase (L(pro)) of foot-and-mouth disease virus (FMDV) plays a critical role in viral pathogenesis. Molecular studies have demonstrated that L(pro) inhibits translation of host capped mRNAs and transcription of some genes involved in the innate immune response. We have used microarray technology to study the gene expression profile of bovine cells infected with wild type (WT) or leaderless FMDV. Thirty nine out of approximately 22,000 bovine genes were selectively up-regulated by 2 fold or more in leaderless versus WT virus infected cells. Most of the up-regulated genes

corresponded to IFN-inducible genes, chemokines or transcription factors. Comparison of promoter sequences suggested that host factors NF-kappaB, ISGF3G and IRF1 specifically contributed to the differential expression, being NF-kappaB primarily responsible for the observed changes. Our results suggest that L(pro) plays a central role in the FMDV evasion of the innate immune response by inhibiting NF-kappaB dependent gene expression.

Text in English

Ganadería Urbana / Urban Livestock



Desafíos y oportunidades para la Ganadería Urbana y Periurbana en ciudades de América Latina y El Caribe

Castro G, Lozano A

IPES Promoción del Desarrollo Sostenible

Una de las actividades de la agricultura urbana y periurbana es la producción pecuaria. Este Cuaderno toma como base distintas experiencias desarrolladas en ciudades de América Latina y El Caribe y referencias generales a casos de otros países y continentes en los que se incluye la ganadería urbana y periurbana como una actividad frecuente al interior y alrededor de las ciudades, buscando promover la discusión y el análisis sobre las ventajas y limitaciones de dicha actividad.

Text in Spanish

<http://www.ipes.org/images/agriculturaUrbana/documents/publicaciones/cuaderno7.pdf>

Influenza Aviar / Avian Influenza



Can preening contribute to influenza A virus infection in wild waterbirds?

Delogu M, De Marco MA, Di Trani L, Raffini E, Cotti C, Puzelli S, Ostanello F, Webster RG, Cassone A, Donatelli I

PLoS One 2010 Jun; 5 (6): e11315

Wild aquatic birds in the Orders Anseriformes and Charadriiformes are the main reservoir hosts perpetuating the genetic pool of all influenza A viruses, including pandemic viruses. High viral loads in feces of infected birds permit a fecal-oral route of transmission. Numerous studies have reported the isolation of avian influenza viruses (AIVs) from surface water at aquatic bird habitats. These isolations indicate aquatic environments have an important role in the transmission of AIV among wild aquatic birds. However, the progressive dilution of infectious feces in water could decrease the likelihood of virus/host interactions. To evaluate whether alternate mechanisms facilitate AIV transmission in aquatic bird populations, we investigated whether the preen oil gland secretions by which all aquatic birds make their feathers waterproof could support a natural mechanism that concentrates AIVs from water onto birds' bodies, thus, representing a possible source of infection by preening activity. We consistently detected both viral RNA and infectious AIVs on swabs of preened feathers of 345 wild mallards by using reverse transcription-polymerase chain reaction (RT-PCR) and virus-isolation (VI) assays. Additionally, in two laboratory experiments using a quantitative real-time (qR) RT-PCR assay, we demonstrated that feather samples (n = 5) and cotton swabs (n = 24) experimentally impregnated with preen oil, when soaked in AIV-contaminated waters, attracted and concentrated AIVs on their surfaces. The data presented herein provide information that expands our understanding of AIV ecology in the wild bird reservoir system.

Text in English

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2892510/pdf/pone.0011315.pdf>



The effect of inoculation dose of a highly pathogenic avian influenza virus strain H5N1 on the infectiousness of chickens

Spekreijse D, Bouma A, Stegeman JA, Koch G, de Jong MC.
Vet Microbiol. 2010 Jun

Highly pathogenic avian influenza is of major concern for the poultry industry, as the virus can spread rapidly in and between flocks, causing high mortality and severe economic losses. The aim of this study was to determine the probability of infection and to determine dose-dependent virus transmission (direct transmission) for various inoculation doses. Two transmission experiments with pair-wise housed layer type chickens were performed, in which one bird per pair was inoculated with an HPAI H5N1 virus and the other contact-exposed. Various inoculation doses were used to determine the susceptibility (ID(50)), and possible relation between ID(50), and infectiousness, expressed as the amount of virus shedding and the probability of contact birds becoming infected. The infectious H5N1 dose (CID(50)) in this study was an estimated 10(2.5) egg infectious dose (EID(50)). Increasing the dose increased the probability of infection but survival from infection was independent of dose. In addition, increasing the dose decreased the mean latent period in the inoculated chickens significantly. This could be important for determining the time of onset of infection in a flock and thus allowing more accurate identification of the source of infection. Moreover, the amount of virus shed in trachea and cloaca by the inoculated chickens in the time between inoculation and contact infection, also differed between the various dose groups. Despite differences in latent period and virus shedding, the transmission rate parameter beta and reproduction ratio R(0) did not differ significantly between the various dose groups. This implies that in this experiment the amount of virus shedding is not a measure to predict transmission or the infectiousness of chickens.

Text in English (article in press)

Influenza



Reassortment between avian H5N1 and human H3N2 influenza viruses creates hybrid viruses with substantial virulence

Li C, Hatta M, Nidom CA, Muramoto Y, Watanabe S, Neumann G, Kawaoka Y.
Proc Natl Acad Sci U S A. 2010 Mar; 107 (10): 4687-92

The spread of avian H5N1 influenza viruses around the globe has become a worldwide public health concern. To evaluate the pathogenic potential of reassortant viruses between currently cocirculating avian H5N1 and human H3N2 influenza viruses, we generated all the 254 combinations of reassortant viruses between A/chicken/South Kalimantan/UT6028/06 (SK06, H5N1) and A/Tokyo/Ut-Sk-1/07 (Tok07, H3N2) influenza viruses by reverse genetics. We found that the presence of Tok07 PB2 protein in the ribonucleoprotein (RNP) complex allowed efficient viral RNA transcription in a minigenome assay and that RNP activity played an essential role in the viability and replicative ability of the reassortant viruses. When the pathogenicity of 75 reassortant H5 viruses was tested in mice, 22 were more pathogenic than the parental SK06 virus, and three were extremely virulent. Strikingly, all 22 of these viruses obtained their PB2 segment from Tok07 virus. Further analysis showed that Tok07 PB1 alone lacked the ability to enhance the pathogenicity of the reassortant viruses but could do so by cooperating with Tok07 PB2. Our data demonstrate that reassortment between an avian H5N1 virus with low pathogenicity in mice and a human virus could result in highly pathogenic viruses and that the human virus PB2 segment functions in the background of an avian H5N1 virus, enhancing its virulence. Our findings highlight the importance of surveillance programs to monitor the emergence of human H5 reassortant viruses, especially those containing a PB2 segment of human origin.

Text in English

<http://www.pnas.org/content/early/2010/02/18/0912807107.full.pdf+html>

Supporting Information

<http://www.pnas.org/content/suppl/2010/02/19/0912807107.DCSupplemental/pnas.200912807SI.pdf>

Inocuidad de los Alimentos / Food Safety



Potential public health impact of *Salmonella* and *Campylobacter* performance guidance for young chickens and turkeys

USDA/FSIS
2010

This document outlines methods and results to estimate the potential public health impact of revised performance guidance for *Salmonella* and new performance guidance for *Campylobacter* for young chickens and turkeys.

This document is not a risk assessment; it is an illustrative example of potential human illnesses that might be avoided given implementation of new performance guidance for *Salmonella* and *Campylobacter*. At this time, FSIS is proposing guidance that does not require a risk assessment to implement. Although the estimates developed in this document represent part of a risk assessment, there are important elements that are not included here that are necessary to complete a risk assessment. In particular, this document does not consider uncertainty about the estimates nor does it complete a sensitivity analysis of the underlying model. Therefore, the estimates provided should be considered illustrative.

Text in English

http://www.fsis.usda.gov/PDF/Potential_Public_Health_Impact_Salmonella_Campylobacter%20Performance%20Guidance_Chickens_Turkeys.pdf



La refrigeración y la inocuidad de los alimentos

USDA/FSIS

El refrigerador es una de las piezas de equipo en la cocina para mantener los alimentos inocuos. Estas unidades eléctricas, hoy son tan comunes, que nos olvidamos que alguna vez el refrigerador fue más que una pequeña caja con un bloque de hielo usado para suplir una fuente independiente de aire frío. Pero esto nos recuerda instantáneamente lo importante que es en nuestras vidas, cuando se va la corriente de luz o falla la unidad, poniendo la inocuidad de los alimentos en peligro.

Text in Spanish

http://www.fsis.usda.gov/PDF/Refrigeration_&_Food_Safety_SP.pdf



UK Research and Innovation Strategy for *Campylobacter* in the food chain - 2010-2015

Food Standards Agency, Biotechnology and Biological Sciences Research Council (BBSRC), Department for Environment, Food and Rural Affairs (Defra), Northern Ireland Department for Agriculture and Rural Development, the Scottish Government, Global Food Security
2010

The veterinary public health activities of the Pan American Health Organization (PAHO) over the past 58 years have been devoted to the strategic orientation and development of priorities for the health sector with three main strategic areas, as follows: surveillance, prevention and control of zoonoses, prevention of foodborne diseases and promotion of animal health to boost production and productivity and, consequently, food security and socio-economic development. For PAHO, the link between health and agriculture is undeniable and their integration essential.

Text in English

<http://www.food.gov.uk/multimedia/pdfs/campylobacterstrategy.pdf>

Leishmaniasis



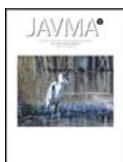
Guidelines for prevention of leishmaniasis in dogs

Maroli M, Gradoni L, Oliva G, Castagnaro M, Crotti A, Lubas G, Paltrinieri S, Roura X, Zini E, Zatelli A

J Am Vet Med Assoc. 2010 Jun; 236 (11): 1200-6

We recommend that any healthy dogs living in or visiting areas in which leishmaniasis is endemic be protected from phlebotomine bites to prevent *Leishmania* infections (individual protection). Because dogs receiving treatment for leishmaniasis still can be infectious to sand flies despite clinical cure and reduction in parasite load having been achieved, we also recommend that any *Leishmania*-affected dogs living in leishmaniasis-endemic areas be protected from phlebotomine bites as a measure to reduce infection risk in the human and canine community (mass protection).

Text in English



Guidelines for treatment of leishmaniasis in dogs

Oliva G, Dvm XR, Crotti A, Maroli M, Castagnaro M, Gradoni L, Lubas G, Paltrinieri S, Zatelli A, Zini E

J Am Vet Med Assoc. 2010 Jun; 236 (11): 1192-8

Treatment of dogs with leishmaniasis is a challenge for veterinarians because of the unpredictable course of disease. On the basis of the reviewed literature and the authors' experience, some aspects of the present guidelines should be highlighted to help practitioners manage affected dogs. Correct determination of the clinical stage of leishmaniasis is important because treatment recommendations vary accordingly. Anti-*Leishmania* drugs should be used only if their efficacy has been validated in scientific studies. If the clinical condition of diseased dogs requires it, ancillary treatment should be added. Veterinarians should verify that anti-*Leishmania* drugs have been correctly administered by dog owners. Finally, dogs should be examined during and after completion of anti-*Leishmania* treatment.

Text in English

Leptospirosis



Report of the First Meeting of the Leptospirosis Burden Epidemiology Reference Group

WHO
2010

The Leptospirosis Burden Epidemiology Reference Group (LERG), convened as an advisory group to the Director-General of WHO, is tasked with quantifying and describing the leptospirosis burden in different populations, using summary measures of mortality and disability, such as disability-adjusted life years (DALYs).

Text in English

http://whqlibdoc.who.int/publications/2010/9789241599894_eng.pdf



Study on the efficacy of *Leptospira* vaccines developed from serovars isolated from Trinidad and comparison with commercial vaccines using a hamster model

Suepaul SM, Carrington CV, Campbell M, Borde G, Adesiyun AA
Vaccine 2010 Jun

A hamster model was used to determine the efficacy of commercially prepared canine vaccines against

Leptospira serovars circulating in Trinidad and to assess the effectiveness of killed whole-cell vaccines prepared from local isolates. The local isolates used for vaccine preparation and challenge were isolates of serovars Copenhageni and Mankarso obtained from a local dog and rodent. Their estimated lethal dose-50 (LD(50)) were 5 and 10 organisms, respectively and clinical signs observed on infection were consistent with leptospirosis. An unvaccinated control group of hamsters and other groups of hamsters that had been vaccinated with 3 doses of (i) in-house whole-cell Copenhageni vaccine, (ii) in-house whole-cell Mankarso vaccine, (iii) commercial vaccine Brand A or (iv) commercial vaccines Brand B were challenged with 1000 times the LD(50) of the respective challenge serovar. The most commonly used commercial vaccine (Brand A) did not offer protection to challenged hamsters, whereas Brand B facilitated the renal carrier state of the Leptospira organism. In contrast the whole-cell vaccines developed from local strains of serovars Copenhageni and Mankarso, protected all hamsters tested from both clinical disease and renal carrier states.

Text in English (article in press)



Isolation of Leptospira interrogans from suburban rats in Tandil, Buenos Aires, Argentina

Scialfa E, Bolpe J, Bardón JC, Ridaó G, Gentile J, Gallicchio O
Rev Argent Microbiol. 2010 Jun; 42 (2): 126-128

The main objective of this study was to investigate the role of wild rodents as Leptospira spp. reservoirs in a suburban area of Tandil city, Buenos Aires province (Argentina), where a person had died due to pulmonary leptospirosis. The specific objectives were: to estimate the rodent density near the patient's home, to determine the serological prevalence and isolation of leptospirosis from wild rodents, and to identify the isolated strains. The area examined was a suburban neighbourhood in Tandil near the Languyú stream, where the patient's house is located. Rattus norvegicus were trapped on the stream banks during two nights and a high capture rate (70%), was obtained. All rats (42) were examined serologically by the microscopic agglutination test (MAT), and 22 of them (52.3%) reacted with Leptospira serovars castellanis, canicola, grippityphosa, icterohaemorrhagiae and hebdomadis at a titer of 1:50. The kidneys from 25 animals were cultured, and 24 isolates of L. interrogans (96%) were obtained. The isolated strains were identified as Icterohaemorrhagiae serogroup by MAT performed with rabbit hyperimmune reference sera. These findings showed a high density of suburban rodents highly infected with pathogenic leptospira, sharing environment in close contact with humans with evidence of leptospiral disease.

Text in English

<http://www.scielo.org.ar/pdf/ram/v42n2/v42n2a12.pdf>

Rabia / Rabies



Fine mapping and interaction analysis of a linear rabies virus neutralizing epitope

Cai K, Feng JN, Wang Q, Li T, Shi J, Hou XJ, Gao X, Liu H, Tu W, Xiao L, Wang H.
Microbes Infect. 2010 Jun

A novel human antibody AR16, targeting the G5 linear epitope of rabies virus glycoprotein (RVG) was shown to have promising antiviral potency. Using AR16, the minimal binding region within G5 was identified as HDFR (residues 261-264), with key residues HDF (residues 261-263) identified by alanine replacement scanning. The key HDF was highly conserved within phylogroup I Lyssaviruses but not those in phylogroup II. Using computer-aided docking and interaction models, not only the key residues (Asp30, Asp31, Tyr32, Trp53, Asn54, Glu99, Ile101, and Trp166) of AR16 that participated in the interaction with G5 were identified, the van der Waals forces that mediated the epitope-antibody interaction were also revealed. Seven out of eight presumed key residues (Asp30, Asp31, Tyr32, Trp53, Asn54, Glu99, and Ile101) were located at the variable regions of AR16 heavy chains. A novel mAb cocktail containing AR16 and CR57, has the potential to recognize non-overlapping, non-competing

epitopes, and neutralize a broad range of rabies virus.

Text in English (article in press)

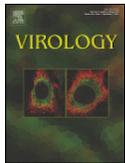


Importance of antirabies revaccination for an adequate antirabies protection in bovine newborns

Filho OA, Megid J, Geronutti L, Ratti J Jr, Kataoka AP, Martorelli LF
Clin Vaccine Immunol. 2010 Jul; 17 (7): 1159-61

The transfer of antirabies immunoglobulins in cows that were prime vaccinated and cows that were revaccinated against rabies correlated to the serum titers in their offspring was evaluated. The results demonstrated that revaccination against rabies during pregnancy induces neutralizing antibody titers at a protective level that are transferred directly to calves through colostrum and reinforce the importance of revaccination for improved colostrum antibody transfer and offspring protection against rabies.

Text in English



Rabies virus in insectivorous bats: Implications of the diversity of the nucleoprotein and glycoprotein genes for molecular epidemiology

Oliveira RD, de Souza SP, Lobo RS, Castilho JG, Macedo CI, Carnieli P Jr, Fahl WO, Achkar SM, Scheffer KC, Kotait I, Carrieri ML, Brandão PE
Virology 2010 Jul

Insectivorous bats are the main reservoirs of rabies virus (RABV) in various regions of the world. The aims of this study were to (a) establish genealogies for RABV strains from different species of Brazilian insectivorous bats based on the nucleoprotein (N) and glycoprotein (G) genes, (b) investigate specific RABV lineages associated with certain genera of bats and (c) identify molecular markers that can distinguish between these lineages. The genealogic analysis of N and G from 57 RABV strains revealed seven genus-specific clusters related to the insectivorous bats *Myotis*, *Eptesicus*, *Nyctinomops*, *Molossus*, *Tadarida*, *Histiotus* and *Lasiurus*. Molecular markers in the amino acid sequences were identified which were specific to the seven clusters. These results, which constitute a novel finding for this pathogen, show that there are at least seven independent epidemiological rabies cycles maintained by seven genera of insectivorous bats in Brazil.

Text in English (article in press)

Tuberculosis Bovina / Bovine Tuberculosis



Potential application of new diagnostic methods for controlling bovine Tuberculosis in Brazil

Medeiros LS, Marassi CD, Figueiredo EES, Lilenbaum W
Braz J Microbiol. 2010 Oct; 41 (3): 531-541

Bovine tuberculosis, a chronic infection in cattle caused by *Mycobacterium bovis*, remains an economic and public health problem for several countries. Due to its economic impact on international trade, contagious nature, and implications for human health, global programs to eradicate the disease were implemented worldwide. Those programs are based on slaughtering PPD-reactive animals. Despite the National Programs in Brazil, complete eradication has not been achieved, and the disease remains, albeit at a lower prevalence.

The central purpose of this review is to address diagnostic tests for tuberculosis. Considering the course of the infection in cattle, at least two tests, ideally complementary to one another, may be necessary for an adequate diagnosis: the first based on the cellular response, and the second capable of identifying anergic animals by detection of specific anti-*M. bovis* antibodies.

Text in English

<http://www.scielo.br/pdf/bjm/v41n3/aop0210.pdf>

Eventos / Events

GEOVET 2010

1-3 December, 2010

Sydney, Australia

<http://sydney.edu.au/vetscience/research/geovet/index.shtml>



Salud Pública Veterinaria
Centro Panamericano de Fiebre Aftosa



Veterinary Public Health
Pan American Foot and Mouth Disease Center

Centro de Documentación / Documentation Center (CEDOC)

Teléfono / Phone: 55 21 3661-9045 -

<http://new.paho.org/panaftosa>

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