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Integration of participatory approaches into surveillance systems

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Summary

Animal health surveillance is essential for protecting public health, enhancing access to international markets for animals and their products, and improving animal health, production and welfare. It is of vital importance for protecting and improving the livelihoods of diverse groups of livestock keepers and stakeholders in livestock value chains. Surveillance systems consist of sets of complementary components which generate information to inform risk assessment, decision-making and policy formulation for both national programmes and international trade. Participatory approaches have the potential to add value to surveillance systems by enhancing their performance, especially their sensitivity and timeliness, and encouraging the inclusion of marginalised groups. This paper summarises key considerations in the assessment and design of animal health surveillance and discusses how participatory approaches can be integrated into comprehensive surveillance systems, leading to a more effective overall outcome for both domestic and international purposes.

Keywords

Animal health – Participatory disease surveillance – Participatory epidemiology – Public health – Risk-based – Surveillance.

Animal health surveillance

Definition, characteristics and requirements

The objectives of surveillance programmes include the support of economic growth and stakeholder livelihoods, the protection of public health and the enhancement of access to markets for trade in animals and their products. Surveillance achieves this by providing information for more meaningful assessment of risks and impacts that, in turn, leads to more effective management of animal health and welfare. Examples of activities that support these overall objectives include prioritising diseases to inform policy and providing data to evaluate animal health programmes (16).

As a first step in designing or reviewing a national or international surveillance system, a country or region's authorities should define a specific set of surveillance objectives, appropriate to the socio-economic and epidemiological context, which will then inform the design of the system.

The ideal mix of outputs from the surveillance system is that combination best suited to achieving the objectives of the system within the available resources. Surveillance has been defined as 'information for action' (15) and its purpose is to support effective decision-making. Examples of such decisions include policy and priority setting, response to outbreaks and approval of trade movements. The outputs generated by surveillance systems can include the detection of new disease events, the demonstration of freedom from specific diseases or infections, or identification of the level and distribution of diseases endemically present in an animal population. When designing surveillance systems, choices need to be made that maximise the cost-effectiveness of the system outputs without sacrificing the quality and timeliness of the decision-making or the appropriateness of the actions taken.

Taking into consideration the objectives of surveillance, an effective surveillance programme seeks to achieve an appropriate balance of the performance criteria listed below, as adapted from Thacker (22). These criteria are:

– to be able to detect a large percentage of suspicious events for investigation and diagnosis

– to be sensitive and specific, so that a useful percentage of events are correctly diagnosed

– to be timely, so that information can be acted on quickly

– to be representative of the risk structure of the population in terms of production systems, social groups, economic classes, geographic areas and other characteristics

– to be flexible as disease situations evolve, particularly for detecting the expected increase in numbers of emerging infectious diseases

– to be simple so that it can be implemented easily and consistently, and so that its outputs are meaningful and easy to communicate

– to be sustainable, with a broad sense of ownership, achieved through the participation of stakeholders in the design and oversight of the system and a perception that the output is useful and serves the needs of stakeholders.

Need for combination of surveillance system components

Surveillance systems consist of a range of components (2), which together are designed to achieve the specific objectives of the surveillance programme (18). There is no single surveillance system component that can meet all of the above performance criteria on its own and no ideal mixture of components that fits all situations. The various components allow the investigation of different aspects of health events and serve to complement one another in achieving the specific surveillance objective, whether the surveillance programme is national or international.

Animal health surveillance systems typically include the following broad system components:

– passive reporting

– active clinical surveillance

– sentinel monitoring

– outbreak investigation

– biological or laboratory testing

– targeted epidemiological studies

– border inspection.

The emphasis on each of the different components depends on the context in terms of resources, disease status and the objectives of the surveillance system.

International standards emphasise the efficacy of risk-based approaches to surveillance system design (21, 23). These approaches are particularly aimed at more cost-effective, early detection of disease introductions or emerging health problems. Participatory approaches can be used to improve the quality of the data obtained through active clinical surveillance, since they can enhance the sensitivity of case detection and the timeliness of information. Participatory approaches to surveillance are risk based, in that they use a risk-based sampling approach that prioritises high-risk sites.

Participatory approaches for surveillance

Definitions and principles

Participatory epidemiology is the application of inclusive approaches to epidemiology (8). The established methods of participatory rural appraisal (17, 19) have already become a key tool in the control of transboundary diseases (5). Participatory epidemiology was first developed to enhance the effectiveness of rinderpest surveillance in pastoralist systems, and is increasingly being applied to a variety of animal and human diseases in pastoral, mixed farming, peri-urban and urban systems.

Participation is the empowerment of stakeholders to identify and solve their own problems. True participation goes beyond consultation to give stakeholders a role in decision-making, so that they share in the control of the process. Participatory approaches involve a shift in the delivery of Veterinary Services, from a 'top-down' centralised approach to a 'bottom-up' approach of understanding the needs and priorities of diverse livestock producers. The participation of livestock owners and other stakeholders in surveillance systems ensures that the systems are responsive to stakeholders' needs and increases their sense of ownership of and commitment towards sustaining the system.

The principles behind participatory approaches in surveillance are:

– stakeholders, especially livestock owners, have valuable technical knowledge that is essential in understanding epidemiological scenarios

– technical experts cannot anticipate all the issues, opportunities and threats that are important in understanding field situations

– flexible approaches that allow for the discovery of new, un-anticipated information or issues and place partial control of the information collection process into the hands of the stakeholders are an important component of successful epidemiological research and surveillance, and lead to more effective control and prevention of diseases

– the strength of the approach lies in its flexible and qualitative nature. It informs and complements more structured and quantitative methods

– the social context of a disease and the stakeholders involved are taken into consideration

– information from diverse sources collected through a variety of methods is analysed in an iterative process referred to as triangulation.

Diagnostic and curative services are primarily private goods, delivered by private animal health providers, such as veterinarians, para-veterinarians and community animal health workers. An increasing global trend is that public veterinarians are no longer engaged in these kinds of services. As a result, there is a widening gap between the Veterinary Services and livestock owners, as public veterinarians rarely have the opportunity to engage with farmers, to learn about their views, their problems and their disease priorities. Participatory approaches to surveillance help to close this gap, in both developed and developing countries, by bringing Veterinary Services more into contact with a wide range of livestock-owning stakeholders.

Using participatory methods in animal health surveillance systems gives livestock keepers a greater role in appraising, analysing and planning animal health tasks. This leads to more appropriate and potentially more acceptable control activities. It can help health institutions to improve their understanding of the epidemiological determinants of disease and the socio-economic context in which disease occurs.

Participatory disease surveillance (PDS) is a form of active clinical surveillance (8). It involves the use of participatory approaches and is aimed at detecting clinical cases, which can then be confirmed by specific biological tests. Participatory disease surveillance has been used for purposeful searching for the presence of disease or to contribute to the demonstration of the absence of disease. It can rapidly identify disease events through its reliance on traditional knowledge networks that can provide information on disease events across a community and over time. The PDS approach can be used retrospectively and longitudinally to explore the evolution of disease situations in an area. As PDS often enhances the sensitivity of disease detection, it is important that stakeholders are adequately prepared for a possible increase in the number of such events detected, and that an appropriate capacity to respond to the increase in surveillance information is incorporated into the surveillance programme.

Diagnostic test support, including field-based diagnostic tests, is an integral part of PDS and increases its specificity. Data generated by PDS practitioners can be rapidly communicated to decision-makers through phone and text messages, including images of clinical cases and test results. It is essential that the outbreaks detected by PDS practitioners are confirmed according to national diagnostic standards, in a manner fully compatible with national and international disease reporting standards.

Lessons learned from using participatory disease surveillance as part of a surveillance programme

In a variety of national and disease contexts, PDS has contributed to finding diseases and understanding their epidemiology. Numerous case studies, training guides and training materials for trainers have been published or are available on the Internet (17). The use of PDS has increased both the number of cases detected and our knowledge of the range and risks associated with disease. This has been the case for a variety of different types of disease situations, including rare diseases, such as rinderpest in East Africa (9); emerging diseases, such as peste des petits ruminants in Pakistan (3) and Central Asia, or Rift Valley fever in Kenya; and highly prevalent diseases, such as highly pathogenic avian influenza in Indonesia (1, 15) or foot and mouth disease in Pakistan (10). In the case of emerging or prevalent but under-reported diseases, the detection rate for the target disease sometimes increases dramatically (ten-fold or more) and cases are also reported from previously neglected communities or social groups (3, 5). New programmes are being established in Asia and Africa that use PDS for avian influenza surveillance (4). Participatory disease surveillance has also been used in programmes to show freedom from disease. In fact, PDS was the key to detecting the last outbreaks of rinderpest in the Greater Horn of Africa, and to subsequently generating clinical evidence to demonstrate freedom from that disease in the Greater Horn of Africa and Asia (9).

Where it has been used, PDS has generally made a useful contribution to strategy and policy reform, and thus to animal health surveillance systems that better reflect the needs and priorities of stakeholders and make more effective use of limited resources. Examples of changes in Veterinary Services, as a result of integrating PDS into the national surveillance system, include the realigning of national disease priorities in Pakistan to take the disease problems of poor rural farmers into consideration (11), and the deployment of PDS practitioners as a first line of response for investigating potential disease emergencies in Kenya (D. Chibeau, personal communication). Participatory disease surveillance is an effective driver for institutional change because it focuses Veterinary Services on the needs and priorities of farmers. It creates a community of practice within Veterinary Services that is customer-oriented, and improves communication between livestock keepers and animal health service providers. Participatory disease surveillance can therefore lead to more acceptable surveillance systems and control programmes (5, 9).

Compared to random sample surveys with laboratory-driven screening approaches to active surveillance, PDS appears, in many cases, to be more cost effective in terms of the cost per outbreak detected (14, 20). This largely results from the risk-based approach and a more rational use of costly biological tests. On the other hand, compared to predominantly passive systems that depend on farmers reporting disease, PDS may be more expensive to sustain as it does require that practitioners pro-actively visit farmers. However, passive reporting systems usually have poor sensitivity and sometimes fail to detect the presence of selected diseases entirely. As with other forms of surveillance, the costs of PDS can be managed by targeting it at the areas of highest risk for diseases of concern.

Where it is considered appropriate to include a participatory surveillance component in the surveillance system, it is best for a country to invest in a core team of well-trained and experienced PDS practitioners who are problem-solvers and able to work throughout the country. This is problematic for highly decentralised countries. Programmes that train large numbers of people to act as enumerators dispersed throughout local communities suffer from the dilution of training and monitoring efforts, leading to a reduction in the quality of surveillance data. Large programmes are also associated with significant and continuing costs that may be beyond the means of developing countries. As the size of the programme increases, there is also a diminishing return on investment, in terms of the added value of the additional information.

The lessons learned from the use of participatory methods in animal health to date come mainly from developing countries. The contribution that participatory approaches can make to programmes in developed countries should be evaluated in pilot programmes that are designed to assess the impact of potential improvements. Developed countries periodically express interest in participatory methods. However, most capacity-building resources in these methods are usually found in organisations dedicated to development. This is nonetheless likely to change as European and Asian universities are beginning to experiment with participatory approaches to epidemiology (6, 13). Participatory epidemiology is now included in undergraduate and graduate course work in Japan (M. Kadohira & K. Makita, personal communication).

When the target disease is present in a country, implementing PDS increases the number of outbreaks detected and confirmed. In many cases where PDS has been implemented, decision-makers were not adequately prepared to respond to the flood of new disease information or to deal with potentially high numbers of confirmed outbreaks. For action to be taken in response to surveillance findings, effective risk management policies, based on adequate resources and effective disease control strategies, must be in place. These policies must be continually reviewed and updated, based on experience and information. If surveillance outputs are not met with

specific actions that are meaningful to stakeholders, the motivation to carry out effective disease surveillance and control will quickly diminish.

How best to integrate participatory disease surveillance into surveillance systems

Veterinary authorities are required to regularly review the objectives of animal health surveillance systems and, in particular, to make them more cost effective. In this context, and as illustrated above, participatory approaches are being proposed as a complementary approach to conventional methods, to aid more effective surveillance. However, due to the qualitative aspects of PDS, further work must be done to provide guidance on the best methods for integrating PDS with more traditional surveillance approaches. Nonetheless, as shown above, PDS is an innovative approach that has already led to enhanced animal health surveillance systems, in terms of disease detection and monitoring and communication and collaboration between medical professionals and communities. Performance monitoring using quantifiable indicators (12) would enable decision-makers to check the efficacy and cost-effectiveness of surveillance and the impact of participatory approaches on the performance of the overall surveillance system.

To implement performance monitoring that compares different components of the overall surveillance system, information systems must record the source of data, i.e. the surveillance activity that generated the disease detection. This information is often not routinely available from national reporting databases. Indicators must be tailored to the system in place, but are generally based on rate (i.e. the number of detections by surveillance activity per period of time). Cost-effectiveness can be assessed and compared across system surveillance components by dividing the cost of operating a particular surveillance component by the number of disease detections per time period.

Conclusion: integrating participatory disease surveillance into national surveillance systems

Veterinary authorities should clearly identify surveillance objectives and undertake strategic reviews of their animal health surveillance information needs. This information can then be used to select an appropriate combination of surveillance activities (or system components) that best meet these objectives and information needs. The seven characteristics of effective surveillance programmes, derived from Thacker (22), provide performance criteria for the design and evaluation of surveillance systems. A responsible approach will consider the achievability, cost-effectiveness and sustainability of each surveillance system component, as well as of the overall system. Experience has shown that, in some situations, the integration of PDS into surveillance programmes in an appropriate manner can enhance their effectiveness by increasing the number of events detected for investigation, as well as increase the timeliness of the detection.

■

L'intégration de démarches participatives dans les systèmes de surveillance

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Résumé

La surveillance de la santé animale est essentielle pour protéger la santé publique, améliorer l'accès des animaux et des produits d'origine animale aux marchés internationaux et protéger la santé et la production animales ainsi que le bien-être des animaux. Elle est d'une importance capitale pour protéger et améliorer les moyens de subsistance de nombreux groupes d'éleveurs et d'autres intervenants travaillant dans la filière de l'élevage. Les systèmes de surveillance sont constitués d'une série de composantes complémentaires qui génèrent l'information nécessaire pour réaliser les évaluations du risque et pour

appuyer les prises de décision et la formulation des politiques à mener, aussi bien dans le cadre des programmes nationaux que du commerce international. Les démarches participatives offrent un potentiel de valeur ajoutée aux systèmes de surveillance en améliorant leurs performances, en particulier leur sensibilité et la rapidité de leur mise en œuvre, tout en favorisant l'inclusion des groupes marginalisés. Les auteurs résument les points qui doivent être pris en considération lors de l'évaluation et de la conception de la surveillance de la santé animale tout en examinant les possibilités d'intégrer les démarches participatives au sein de systèmes de surveillance exhaustifs, afin d'aboutir à un résultat global plus efficace servant des objectifs aussi bien nationaux qu'internationaux.

Mots-clés
Démarche fondée sur le risque – Épidémiologie participative – Santé animale – Santé publique – Surveillance – Surveillance participative des maladies.

Integración de métodos participativos en los sistemas de vigilancia

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Resumen
La vigilancia zoosanitaria es fundamental para proteger la salud pública, favorecer el acceso a los mercados internacionales de animales y productos de origen animal y mejorar el estado de salud, la productividad y el bienestar de los animales. También es de vital importancia para proteger y mejorar los medios de subsistencia de diversos grupos de pastores y otros colectivos que intervienen en la cadena de valor del ganado. Los sistemas de vigilancia están integrados por conjuntos de elementos complementarios entre sí que generan información útil para determinar el riesgo, adoptar decisiones y formular políticas de cara a programas nacionales y al comercio internacional. Los métodos participativos ofrecen la posibilidad de instituir sistemas de vigilancia más útiles porque mejoran su eficacia, especialmente su sensibilidad y rapidez, y alientan la integración de colectivos marginados. Los autores resumen una serie de consideraciones fundamentales para la evaluación y concepción de la vigilancia zoosanitaria y reflexionan sobre el modo de integrar métodos participativos en sistemas globales de vigilancia y de obtener con ello mejores resultados generales a efectos tanto nacionales como internacionales.

Palabras clave
Determinación del riesgo – Epidemiología participativa – Salud pública – Sanidad animal – Vigilancia – Vigilancia de enfermedades participativa.

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