



Queensland University of Technology
Brisbane Australia

This is the author's version of a work that was submitted/accepted for publication in the following source:

Halton, Kate, Sarna, Mohinder, Barnett, Adrian, Leonardo, Lydia, & Graves, Nicholas (2012) *Systematic Review Protocol : "Are community-based interventions effective in identifying and responding to emerging zoonotic infectious diseases?"*. Joanna Briggs Institute, JBI Library of Systematic Reviews.

This file was downloaded from: <http://eprints.qut.edu.au/75187/>

© Copyright 2012 Joanna Briggs Institute

Notice: *Changes introduced as a result of publishing processes such as copy-editing and formatting may not be reflected in this document. For a definitive version of this work, please refer to the published source:*

Review title

Are community-based interventions effective in identifying and responding to emerging zoonotic infectious diseases?

Reviewers

Kate Halton ¹

Elizabeth Jebet Kipsaina ¹

Adrian Barnett ¹

Lydia Leonardo ²

Nicholas Graves ¹

¹Institute of Health & Biomedical Innovation, Queensland University of Technology, Brisbane

² College of Public Health, University of The Philippines, Manila

Review question/objective

The objective of this review is to identify the effectiveness of surveillance systems and community-based interventions in identifying and responding to emerging and re-emerging zoonotic infections in Southeast Asia (SE Asia).

More specifically the research questions are:

1. What is the effectiveness of community-based surveillance interventions designed to identify emerging zoonotic infectious diseases?
2. What is the effectiveness of non-pharmaceutical community-based interventions designed to prevent transmission of emerging zoonotic infectious diseases?
3. How do factors related to the emergence and management of emerging zoonotic infectious diseases impact the effectiveness of interventions designed to identify and respond to them?

Background

The 2004 WHO/FAO/OIE joint consultation on emerging zoonotic diseases defined them as, "a zoonosis that is newly recognized or newly evolved, or that has occurred previously but shows an increase in incidence or expansion in geographical, host or vector range" ¹. Avian influenza, severe acute respiratory syndrome (SARS), coronavirus, Nipah virus, monkeypox, Hendra virus, and the lentiviruses that cause AIDS are a few examples of the growing number of diseases that humans can contract from animals.

The Asia Pacific Region has, unfortunately, been at the epicentre of such epidemics. Over 30 new infectious agents have been detected in the last three decades, 75% of which have originated in animals (zoonoses). ² Zoonotic diseases are predicted to cause an increased economic and health burden in this region. A number of factors contribute to these circumstances. The absence of effective surveillance and control programs, prevailing sociocultural practices and weak public health and veterinary services infrastructure exacerbates the vulnerability of these settings. Other factors including climate change, environmental degradation, encroachment of humans on areas where wildlife exists, cohabitation of humans and food animals within households, and the mixing of species in live animal markets play a role in increased disease transmission.

Influenza A remains a global priority as although it usually causes only minor disease, it can cause epidemics. Approximately 10% to 15% of people worldwide contract influenza annually, with attack rates as high as 50% during major epidemics. ³ Global pandemic viral infections have been devastating. In 2003 the SARS epidemic affected around 8000 people and killed 780. In 2006 a new avian H5N1, and in 2009 a new H1N1 'swine' influenza pandemic threat, caused widespread anxiety. ⁴ In addition to mortality and morbidity these diseases can cause huge economic losses. The economic cost of the major outbreaks of new epidemic zoonotic diseases over the past decade, including SARS and H5N1 influenza, has been estimated to be \$200 billion. ⁴

To prevent and control zoonotic infections in SE Asia, a multi-sectoral and multi-disciplinary approach, involving many levels of the health and non-health sector, is needed, which places a strong emphasis on both the early detection and early control of infectious disease outbreaks.

Surveillance activities

Early detection of disease outbreaks requires effective disease surveillance systems. Systems in developing countries face many operational challenges, including a lack of accurate and timely information exchange between local, provincial, national and regional levels, and inadequate human resource and laboratory capacity for speedy diagnosis. The WHO's Asia Pacific Strategy for Emerging Diseases 2010 highlights the need for community involvement in surveillance, ² but there are no guidelines for which types of emerging diseases should be reported or how developing

countries should conduct surveillance. Zoonotic disease detection and control also depends on effective veterinary surveillance and the ability to contain outbreaks amongst animal populations, systems that are often poorly developed or non-existent in developing countries.

Jones et al.⁵ suggests that local targeted surveillance of at-risk people may be the best way to prevent large-scale emergence. Brownstein et al.⁶ in their discussion of web surveillance suggest that the use of news media and other non-traditional sources of surveillance data such as web-accessible discussion sites and disease reporting networks could facilitate early outbreak detection and increase public awareness of disease outbreaks prior to their formal recognition. May et al.⁷ review the evidence for syndromic surveillance systems in developing countries (systems utilising existing clinical data prior to a diagnosis) and find that this may be a feasible and effective approach to infectious disease surveillance in developing countries.

Evaluating surveillance activities

The effectiveness of surveillance systems in responding generally to emerging infectious diseases has not been reviewed systematically. Reviews aimed at particular contexts (for example, prevention of bioterrorism⁸ and public health surveillance for trachoma²) have been undertaken, however, neither review was able to state whether surveillance systems are achieving the ultimate goal of detecting outbreaks early and providing an accurate picture of infection rates in the area covered by the surveillance program.²

Most evaluations of surveillance programs have been qualitative and focused on evaluating the practical structure and operation of the system rather than its impact on infectious disease transmission.⁹⁻¹¹ Many researchers have used the Centers for Disease Control and Prevention (CDC) guideline which recommends how a surveillance system can be assessed to verify if it meets its objectives.¹² This provides a framework for evaluating how well a system is functioning and determining reasons why it may or may not be functioning to detect and respond to infectious disease outbreaks and/or support ongoing control activities to tackle endemic diseases.

The CDC guideline recommends that reports of surveillance systems include the following:

- descriptions of the public health importance of the health event under surveillance; the system under evaluation; the direct costs needed to operate the system; the usefulness of the system;
- evaluations of the system's simplicity, stability (its ability to withstand external changes), flexibility (that is, "the system's ability to change as surveillance needs change"), acceptability ("as reflected by the willingness of participants and stakeholders to contribute to the data collection, analysis and use"), sensitivity to detect outbreaks, positive predictive value of

system alarms for true outbreaks, representativeness of the population covered by the system, and timeliness of detection.

Prevention and control activities

Control of emerging infectious disease requires an effective response to surveillance data. Single measures such as the use of vaccines or antiviral drugs may be unavailable, unaffordable or not in sufficient quantity. The control of these infectious diseases in resource constrained settings is more likely to be influenced by community-based and behavioural change interventions as well as by strengthening of national and international commitment to their control. ¹³ Over the last decade there have been increased efforts to promote community-based infectious disease control. ²

For vector-borne infections, such as dengue, attention has been focused on interventions to reduce larval, and ultimately adult, vector populations. Programs have attempted to achieve this via a range of chemical, biological and physical interventions to reduce vector populations, as well as trying to initiate behavioural change at the community level to prevent contact with the mosquito vectors. ¹⁴ Heintze et al. have previously reviewed the evidence for community-based dengue control programs ¹⁵. This review completed in 2005 found at that time that the evidence for these activities was weak and inconclusive and suggested a number of priorities for future research in this area. However, the review has not since been updated.

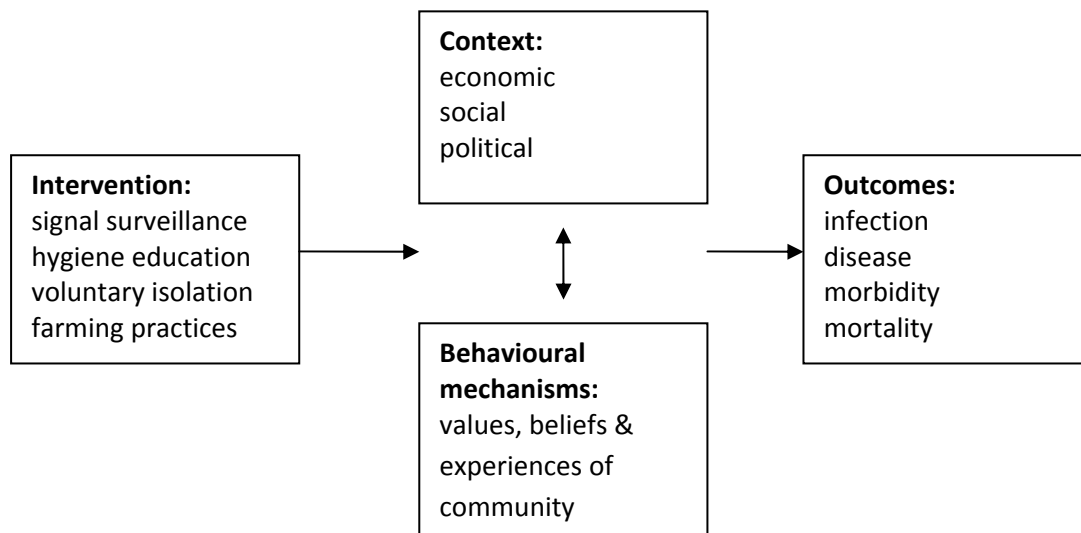
Community-based interventions to control the spread of respiratory viruses, such as influenza, have focused on hygiene and respiratory etiquette to prevent human to human transmission. Many of these interventions have only been evaluated in a developed country context. Aledort et al. ¹⁶ and Jefferson et al. ¹³ undertook systematic reviews of physical interventions to interrupt or reduce the spread of respiratory viruses. Both reviews found handwashing was effective whilst there was no evidence to support school/workplace closure. However these findings from a predominantly North American context may not be generalisable to countries with limited access to safe water and sanitation.

Evaluating control activities

To understand whether community-based control activities will be effective and why requires us to look at the behavioural mechanisms through which these interventions work and the context in which they are based. Behavioural mechanisms operate through the experiences, beliefs and values of groups and individuals. These mechanisms are therefore dependent in part on the context in which they are used. This framework was used in a recent synthetic review of water and sanitation projects.

¹⁷ The framework is shown in Figure 1.

Figure 1: The effects of interventions on outcomes are mediated by context and behavioural mechanisms



Measuring outcomes

For the purposes of this review, a number of different outcomes will be examined, broadly categorised into primary and secondary outcomes. Primary outcomes are measures of infection or disease in the community. As such we will consider studies that report any type of quantitative infection/disease/outbreak outcome data. We will also consider data on morbidity and mortality rates attributable to the infectious disease.

Secondary outcomes are other indicators of the effectiveness of a surveillance and/or control program. These indicators can be used as intermediate outcomes to predict the impact on infection or disease and/or look at how a program is functioning. For example, an intervention program may not show a reduction in disease but may result in an improved capacity for detection or impact on the effectiveness of the overall program. Secondary indicators include activities such as training and supervision, timeliness of reporting and education session or workshop attendance.

Contribution of this review

This review aims to provide a critical review of published evidence that evaluates the effectiveness of community-based surveillance and prevention and control interventions for emerging zoonotic infectious diseases. In addressing the three research questions outlined above we will analyse not only the effectiveness of community surveillance and prevention and control interventions in SE Asia

in identifying and responding to these infectious diseases, but also explore the contextual factors that influence their success.

Inclusion criteria

Types of participants

As mentioned above, the control of infectious diseases in resource constrained settings is more likely to be influenced by community-based and behavioural change interventions. This review will consider studies that evaluate infectious disease surveillance and control interventions that are non-pharmaceutical, non-vaccine, and community-based. Community-based is defined as implemented outside a healthcare institution with at least one component of the intervention targeted directly at the community (e.g. educational meetings, involvement of local leaders). Interventions with no community participation (i.e. top-down vector control programmes) will be excluded as they are outside the scope of this project.

This review will consider studies conducted in communities in Southeast Asian countries. We define SE Asia as the ten member countries of the Association of Southeast Asian Nations (ASEAN).¹⁸ The ASEAN countries are Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam.

We will include studies which report on interventions to prevent the following zoonotic emerging and re-emerging infections. This list has been developed from the list of emerging and re-emerging zoonotic infections published on the CDC website¹⁹ as commonly occurring in SE Asia:

- Avian Influenza
- Dengue Fever
- Nipah Virus
- Severe Acute Respiratory Syndrome

- Rabies

Types of intervention(s)/phenomena of interest

On the basis of preliminary searches identifying the following types of intervention, interventions of interest will include, but not be limited to:

Surveillance Interventions: syndromic surveillance programs, communications programs, training/education of health workers and community workers to detect and/or prevent disease, local level surveillance & response teams, web surveillance. Following the One Health²⁰ concept of a synergistic approach to health we will also include animal/livestock surveillance systems where they are specifically evaluated with respect to their impact on human health and disease outcomes.

Control Interventions (subcategorised into the following):

Health promotion interventions: self-reporting of suspected infections, promotion of voluntary self isolation, advocating use/provision of personal protective equipment, e.g. masks, public/community education on hygiene and respiratory etiquette, safe slaughter and preparation of animals and animal products (in particular poultry),

Physical interventions: contact tracing, isolation, quarantine, social distancing, barriers, school/workplace closure, movement restriction,

Environmental interventions: environmental cleaning, waste disposal, coverage or removal of water containers, vector control, larval control including larvivorous fish and copepods, destruction of potentially infected animals and animal products

Types of outcomes

A range of different outcomes used in the studies will be examined. For the purposes of this review, they can be broadly categorised into primary and secondary outcomes. Primary outcomes aim to measure the incidence of infection or disease in the community. As such we will report on data on rates of infection, disease or outbreaks. We will consider studies that report any type of quantitative infection/disease/outbreak outcome data. From preliminary searches, we anticipate the inclusion of the following types of primary outcome measures:

Primary outcomes: rates of infection, numbers of cases of infection reported and confirmed, mortality rates attributable to the infectious disease, rates of hospitalisation attributable to the infectious disease, number of outbreaks, time/size of epidemic peak, duration of outbreak/epidemic.

To help contextualise our findings and address review question three, we will also extract any information on indicators relating to timely and adequate identification and containment of outbreaks and/or improved capacity for disease control. We will categorise indicators based around the WHO framework for the monitoring and evaluation of surveillance and response systems for communicable disease²¹ and categorise these as secondary outcomes:

Secondary outcomes:

- *Process indicators:* Activities such as training, supervision, developing guidelines and core surveillance functions undertaken,
- *Output indicators:* The results of the activities conducted e.g. proportion of surveillance centres providing timely reporting, number of households with containers covered, proportion of the community attending education session,
- *Outcome indicators:* The extent to which the surveillance and response objectives are being

achieved, including the quality of the surveillance systems and the appropriateness of any outbreak response e.g. proportion of outbreaks where appropriate control response initiated, incidence-reporting-response times, numbers of larvae/vectors, improvements in knowledge relating to hygiene education campaigns.

Note that the fifth category under this framework is Impact indicators (the extent to which the overall goal of the surveillance and response systems is being achieved) which are considered as the main outcomes of our review and discussed above.

Types of studies

Following the recommendations of the Cochrane Effective Practice and Organisation of Care Review Group (EPOC)²², which is concerned with evaluating interventions in community healthcare settings, only studies that provide evidence that draws a comparison between an intervention setting and a non-intervention setting will be included. A second inclusion criterion is that the study must report results as quantitative infection/disease/outbreak data (as described under types of outcomes). We aim to include studies reporting original primary data or systematic reviews of this type of evidence (i.e. not theoretical model based studies).

Acceptable study designs will include: systematic reviews/meta-analyses, randomised controlled trials, controlled clinical trials, controlled before and after trials, interrupted time series (we will require only one time point before and after the intervention). We will also accept mixed-method studies that include one of the above, and systematic review and economic evaluations that are based on one of the above. Conference papers, clinical observations, program reports with only one time point and non-systematic overview articles will be excluded.

The quantitative component of the review will extract data from included studies on all disease outcomes and process indicators measured. This information will be used to address review questions 1 and 2.

The textual component of the review will consider the textual information included in the introduction, methods and discussion of all papers included in the quantitative review. This will be used to supplement the quantitative information on process indicators and address review question 3.

Search strategy

The search strategy aims to find published studies. A three-step search strategy will be utilised in this review. An initial limited search of MEDLINE and CINAHL will be undertaken followed by analysis of the text words contained in the title and abstract, and of the index terms used to describe article. A second search using all identified keywords and index terms will then be undertaken across all included databases. Finally, the reference list of all identified reports and articles will be searched for

additional studies.

Studies published in any language with an abstract available in English will be considered for inclusion in this review. Studies will be assessed for inclusion based on title and abstract only; with studies only translated if they meet inclusion criteria. Studies published between 1980 and 2011 will be considered for inclusion in this review. A start date of 1980 has been chosen as surveillance programs in most Southeast Asian countries commenced in the early 1990s. By including data from 1980, we hope to capture any information on community-based surveillance and intervention programs that may have contributed to the development of formal surveillance programs.²³⁻²⁷

The databases to be searched include: PubMed, CINAHL, ProQuest, EBSCOhost, Web of Science, Science Direct, the Cochrane database of systematic reviews, the WHO library database (WHOLIS), British Development Library, LILACS, World Bank (East Asia) and the Asian Development Bank.

Keywords for the search will reflect i) disease terms, ii) intervention terms and iii) countries of interest; and will be combined systematically as [disease terms] + [intervention terms] + [countries].

Initial keywords:

“influenza”, “avian influenza”, “dengue”, “haemorrhagic fever”, “severe acute respiratory syndrome”, “SARS”, “Nipah virus”, “rabies”, “communicable disease”, “infectious disease”, “zoonotic”, “emerging infectious disease”, “re-emerging infectious disease”, “infectious disease outbreak”, “infectious disease transmission”, “pandemic”, “epidemic”, “infectious disease response”, “infectious disease control”, “pigs”, “bats”, “NOT malaria”

“disease notification”, “surveillance”, “syndromic surveillance”, “electronic surveillance”, “web surveillance”, “local surveillance”

“infection control”, “contact tracing”, “patient isolation”, “voluntary isolation”, “quarantine”, “personal protective equipment”, “protective devices”, “masks”, “protective clothing”, “gloves”, “respiratory protective devices”, “prevention and control”, “hygiene”, “school closure”, “animal handling”, “infected animals”, “breeding places”, “water storage”, “hand washing”, “sneezing”, “larval control”, “vector control”, “education”, “health behaviour”, “health promotion”,

“community organisation”, “community initiative”, “community intervention”, “community workers”, “public health”, “household”, “school-based”, “NOT pharmaceuticals”, “NOT vaccine”

“evaluation”, “effectiveness”, “efficacy”, “sustainability”, “responsiveness”, “acceptability”, “flexibility”

“South east Asia”, “Thailand”, “Singapore”, “Laos”, “Malaysia”, “Brunei”, “Myanmar”, “Burma”
“Philippines”, “Indonesia”, “Cambodia”, “Viet Nam”

Assessment of methodological quality

Infectious disease surveillance and control interventions are hard to evaluate given the spontaneous and random nature with which infections occur. Evaluations may not therefore provide conclusive evidence for or against an intervention. Evidence particularly in a developing country context will predominantly be available from epidemiological studies, which are more prone to bias than randomised controlled trials. To minimise threats to the validity of this review and maximise the information extracted from it we propose the following methods.

Quantitative papers selected for retrieval will be assessed by two independent reviewers for methodological validity prior to inclusion in the review using standardised critical appraisal instruments from the Joanna Briggs Institute Meta Analysis of Statistics Assessment and Review Instrument (JBI-MAStARI) (Appendix I). Any disagreements that arise between the reviewers will be resolved through discussion, or with a third reviewer.

We anticipate that for some study designs that are not covered by the standardised JBI instruments we will use alternative appraisal instruments (Appendix II and III). We have identified extra appraisal instruments for the following study designs:

- cost-effectiveness evaluations
- mixed-methods studies
- systematic reviews/meta-analyses

Data collection

Quantitative data will be extracted from papers included in the review using standardised data extraction tools from JBI-MAStARI. The data extracted will include specific details about the interventions, populations, and study methods, programme theory and other outcomes of significance to the review question and specific review objectives. This will include both disease outcomes and process indicators as described above to enable us to look at both the effectiveness and function of the programs.

To enable us to comment better on why programs have been (un)successful, we will collect both quantitative data (i.e. process indicators) and qualitative data constituting narrative evidence or speculation by the authors on why interventions have been effective or not and any comment on sustainability. The textual data will be extracted from the papers included in the quantitative review to capture the following specific details about the context and mechanisms of the program relevant to the review question and specific objectives:

- Features of the study setting, i.e. the geographical setting, the social, cultural and political

context, the season,

- Features of the interventions i.e. what was done, how it was delivered, who was targeted, where it was delivered and by whom, funding organisation, technical and financial program details and any behavioural mechanisms targeted by the intervention,
- Level of participants i.e. communities, households, individuals, details on age and gender.

Data synthesis

Quantitative papers will, where possible be pooled in statistical meta-analysis using JBI-MAStARI. If both numerator and denominator infection data is available we will examine this as binomial data (e.g. number alive divided by number treated). Otherwise, effect sizes expressed as weighted mean differences (for continuous data) and odds ratio (for categorical data) and their 95% confidence intervals will be calculated for analysis. Heterogeneity will be assessed statistically using the standard Chi-square and also explored using subgroup analyses. Subgroup analyses will be performed on grouping based on the different interventions, diseases, contexts and study designs included in this review. Where statistical pooling is not possible the findings will be presented in narrative form including tables and figures to aid in data presentation where appropriate.

Data extracted regarding the factors that aided or impeded the effectiveness of a specific intervention will be synthesised in narrative summary with the aid of tables and figures. We will use the frameworks for evaluating infectious disease surveillance systems and behavioural interventions outlined in the background section to guide categorisation in our synthesis of this evidence. For surveillance activities we will group abstracted information according to the CDC criterion for evaluating surveillance activities and for control programmes we will use the behavioural change framework to look at mechanisms and context for change.

Conflicts of interest

No financial conflicts of interest to disclose.

Lydia Leonardo was involved in the first national parasitic disease survey in the Philippines and the implementation and monitoring of control interventions for *Schistosomiasis japonicum*. She is part of the Regional Network on Asian Schistosomiasis and Other Helminth Zoonoses (RNAS(+)).

Acknowledgements

This review was funded by a grant provided under a joint call from AusAID, the International Initiative for Impact Evaluation (3ie), and the Department for International Development (DfID).

Expert advice on infectious disease control in SE Asia was provided by Prof John Aaskov, Queensland University of Technology and Prof Pilarita Rivera, University of the Philippines.

References

1. **WHO**. Report of the WHO/FAO/OIE joint consultation on emerging zoonotic diseases; 2004.
2. **WHO**. *Asia Pacific Strategy for Emerging Diseases* World Health Organization; 2005.
3. **Jefferson T, Del Mar C, Dooley L, et al**. Physical interventions to interrupt or reduce the spread of respiratory viruses. *Cochrane Database of Systematic Reviews*. 2010;1:CD006207.
4. **IOM (Institute of Medicine), NRC (National Research Council)**. *Sustaining Global Surveillance & Response to Emerging Zoonotic Diseases* Washington DC: The National Academies Press; 2009.
5. **Jones KE, Patel NG, Levy MA, et al**. Global trends in emerging infectious diseases. *Nature*. 2008;451(7181):990-3.
6. **Brownstein J, Freifeld C, Reis B, Mandl K**. Surveillance sans frontieres: internet-based emerging infectious disease intelligence and the HealthMap project. *PLoS Medicine*. 2008;5(7):e151.
7. **May L, Chretien J-P, Pavlin J**. Beyond traditional surveillance: applying syndromic surveillance to developing settings - opportunities and challenges. *BMC Public Health*. 2009;9(1):242.
8. **Bravata D, McDonald K, Smith W, et al**. Systematic review: surveillance systems for early detection of bioterrorism-related diseases. *Annals of Internal Medicine*. 2004;140:910-922.
9. **Nsubuga P, Eseko N, Wuhib T, Ndayimirije N, Chungong S, McNabb S**. Structure and performance of infectious disease surveillance and response, United Republic of Tanzania, 1998. *Bulletin of the World Health Organization*. 2002;80:196-203.
10. **Soto G, Araujo-Castillo R, Neyra J, et al**. Challenges in the implementation of an electronic surveillance system in a resource-limited setting: Alerta, in Peru. *BMC Proceedings*. 2008;2(Suppl 3):S4.
11. **Wuhib T, Chorba T, Davidiants V, MacKenzie W, McNabb S**. Assessment of the infectious diseases surveillance system of the Republic of Armenia: an example of surveillance in the Republics of the former Soviet Union. *BMC Public Health*. 2002;2:3.
12. **Buehler JW, Hopkins RS, Overhage JM, Sosin DM, Tong V**. Framework for evaluating public health surveillance systems for early detection of outbreaks: recommendations from the CDC Working Group. *MMWR Recomm Rep*. 2004;53(RR-5):1-11.
13. **Jefferson T, Demicheli V, Rivetti D, Jones M, Di Pietrantonj C, Rivetti A**. Antivirals for influenza in healthy adults: systematic review. *The Lancet*. 2006;367(9507):303-313.
14. **Heggenhougen K, Hackethal V, Vivek P**. *The behavioural and social aspects of malaria and its control*. Vol. TDR/STR/SEB/VOL/031 Geneva: WHO Special Programme for Research and Training in Tropical Diseases (TDR); 2003.
15. **Heintze C, Velasco Garrido M, Kroeger A**. What do community-based dengue control programmes achieve? A systematic review of published evaluations. *Transactions of the Royal Society of Tropical Medicine and Hygiene*. 2007;101:317-325.
16. **Aldedort J, Lurie N, Wasserman J, Bozzette S**. Non-pharmaceutical public health interventions for pandemic influenza: an evaluation of the evidence base. *BMC Public Health*. 2007;7(1):208.
17. **Waddington H, Snilstveit B, White H, Fewtrell L**. *Water, sanitation and hygiene interventions to combat childhood diarrhoea in developing countries* New Delhi: International Initiative for Impact Evaluation; 2009 Synthetic Review 1 SR 001).
18. **ASEAN**. Nations of Association of Southeast Asian Nations. 2009.
19. **CDC**. Infectious Disease Information: Emerging Infectious Diseases. Information by Emerging or Reemerging Infectious Disease Topic. Vol. accessed 26/10/2011. Atlanta; 2005.
20. **One health** <http://www.onehealthinitiative.com> accessed 20.12.11
21. **WHO**. Overview of the WHO framework for monitoring and evaluating surveillance and response systems for communicable diseases. *Weekly Epidemiological Record*. 2004;79:322-326.
22. **Cochrane Effective Practice and Organisation of Care Group**; Which study designs are accepted for inclusion in EPOC Reviews? <http://www.epoc.cochrane.org/epoc-author-resources>, accessed 14.10.2011

23. **Coker R, Mounier-Jack S.** Pandemic influenza preparedness in the Asia-Pacific region. *The Lancet*. 2006;368(9538):886-886-9.
24. **John T, Samuel R, Balraj V, John R.** Disease surveillance at district level: a model for developing countries. *The Lancet*. 1998;352:47-50.
25. **Labie D.** Les maladies émergentes en Birmanie [Emerging infectious diseases in Myanmar]. *Medecine sciences : M/S*. 2007;23(1):99-101.
26. **Thai KTD, Nga TTT, Van Nam N, et al.** Incidence of primary dengue virus infections in Southern Vietnamese children and reactivity against other flaviviruses. *Tropical medicine & international health : TM & IH*. 2007;12(12):1553-1557.
27. **Philips Z, Ginelly L, Sculpher M, et al.** Review of guidelines for good practice in decision-analytical modelling in health technology assessment. *Health Technol Assess*. 2004;8(36).

Appendix I - JBI Quantitative appraisal instruments

JBI Critical Appraisal Checklist for Randomised Control / Pseudo-randomised Trial

Reviewer Date

Author Year Record Number

	Yes	No	Unclear	Not Applicable
1. Was the assignment to treatment groups truly random?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Were participants blinded to treatment allocation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Was allocation to treatment groups concealed from the allocator?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Were the outcomes of people who withdrew described and included in the analysis?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Were those assessing outcomes blind to the treatment allocation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Were the control and treatment groups comparable at entry?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Were groups treated identically other than for the named interventions?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Were outcomes measured in the same way for all groups?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Were outcomes measured in a reliable way?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Was appropriate statistical analysis used?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Overall appraisal: Include Exclude Seek further info.

Comments (Including reason for exclusion)

JBI Critical Appraisal Checklist for Comparable Cohort/ Case Control

Reviewer Date

Author Year Record Number

	Yes	No	Unclear	Not Applicable
1. Is sample representative of patients in the population as a whole?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Are the patients at a similar point in the course of their condition/illness?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Has bias been minimised in relation to selection of cases and of controls?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Are confounding factors identified and strategies to deal with them stated?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Are outcomes assessed using objective criteria?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Was follow up carried out over a sufficient time period?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Were the outcomes of people who withdrew described and included in the analysis?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Were outcomes measured in a reliable way?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Was appropriate statistical analysis used?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Overall appraisal: Include Exclude Seek further info.

Comments (Including reason for exclusion)

JBI Critical Appraisal Checklist for Descriptive / Case Series

Reviewer Date

Author Year Record Number

	Yes	No	Unclear	Not Applicable
1. Was study based on a random or pseudo-random sample?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Were the criteria for inclusion in the sample clearly defined?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Were confounding factors identified and strategies to deal with them stated?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Were outcomes assessed using objective criteria?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. If comparisons are being made, was there sufficient descriptions of the groups?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Was follow up carried out over a sufficient time period?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Were the outcomes of people who withdrew described and included in the analysis?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Were outcomes measured in a reliable way?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Was appropriate statistical analysis used?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Overall appraisal: Include Exclude Seek further info

Comments (Including reason for exclusion)

JBI Critical Appraisal Checklist for Economic Evaluations

Reviewer _____ Date _____

Author _____ Year _____ Record Number _____

	Yes	No	Unclear	Not Applicable
1. Is there a well defined question?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Is there comprehensive description of alternatives?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Are all important and relevant costs and outcomes for each alternative identified?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Has clinical effectiveness been established?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Are costs and outcomes measured accurately?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Are costs and outcomes valued credibly?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Are costs and outcomes adjusted for differential timing?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Is there an incremental analysis of costs and consequences?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Were sensitivity analyses conducted to investigate uncertainty in estimates of cost or consequences?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Do study results include all issues of concern to users?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Are the results generalisable to the setting of interest in the review?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Overall appraisal: Include Exclude Seek further info.

Comments (Including reasons for exclusion)

Appendix II - Source of additional appraisal instruments

Systematic reviews

<http://www.sph.nhs.uk/sph-files/S.Reviews%20Appraisal%20Tool.pdf>

Economic evaluations

[http://www.sph.nhs.uk/sph-files/Economic Evaluations 10 Questions.pdf](http://www.sph.nhs.uk/sph-files/Economic%20Evaluations%2010%20Questions.pdf)

Mixed methods studies

http://usir.salford.ac.uk/12969/1/Evaluation_Tool_for_Quantitative_Research_Studies.pdf

Appendix III - Data extraction instruments

Data extraction tool for experimental/observational studies

Data Extraction Table - Surveillance

Reviewer

Date

Publication details

Authors; Year

Publication details

Study details

Study design

Prospective/retrospective

Independent evaluation

Sample size

Type of intervention

Contextual Factors

Study Setting

Country & region

Religion/language (including whether homogenous)

Socioeconomic context

Health system structure & access factors identified by authors (e.g. access to facilities, hierarchical delivery system, level of out-of-pocket costs)

Geographical/spatial/temporal/climatic context

Local profile of infectious disease e.g. endemic, epidemic, seasonal

Participants

Participants (age/gender)

Details of community groups involved

Relationship between individuals delivering program & participating in program

Program details

Program dates & season

Infectious diseases targeted

Core elements of program

Behavioural mechanisms identified by authors
Program theory identified by authors
Methods for program delivery
Who delivered program
Resources required for program delivery
Source of program funding
Program partners (other organisations/departments)

Interaction with other infection surveillance/control systems

Outcomes

Indicators

Process indicators reported by authors (e.g. Proportion of centres providing timely response,

Output indicators reported by authors (e.g. Proportion of population covered, participant knowledge & attitude scores,)

Outcomes

Infection outcomes reported by authors (e.g. Incidence rates, prevalence rates, number of outbreaks, number of secondary cases)

Disease outcomes reported by authors (e.g. Morbidity, mortality, economic outcomes)

Contributing factors

Factors contributing to program success specifically identified by authors

Evidence to support this: unequivocal / credible / unsupported

Factors contributing to program failure specifically identified by authors

Evidence to support this: unequivocal / credible / unsupported

Conclusions

Authors conclusions

Valid based on study results: unequivocal / credible / unsupported

Reviewers conclusions

Data Extraction Table - Prevention & Control

Reviewer

Date

Publication details

Authors; Year

Publication details

Contextual Factors

Study details

Study design

Prospective/retrospective

Independent

Sample size

Type of intervention

Study Setting

Country & region

Religion/language (including whether homogenous)

Health system factors

Geographical/spatial/temporal/climatic context

Local profile of infectious disease e.g. endemic, epidemic, seasonal

Participants

Participants (age/gender)

Details of community groups involved

Relationship between individuals delivering program & participating in program

Program details

Program dates & season

Infectious diseases targeted

Core elements of program

Behavioural mechanisms identified by authors

Program theory identified by authors

Methods for program delivery

Who delivered program

Resources required for program delivery

Source of program funding

Program partners (other organisations/departments)

Interaction with other infection surveillance/control systems

Outcomes

Indicators

Process indicators reported by authors (e.g. Proportion of centres providing timely response,

Output indicators reported by authors (e.g. Proportion of population covered, participant knowledge & attitude scores,)

Outcomes

Infection outcomes reported by authors (e.g. Incidence rates, prevalence rates, number of outbreaks, number of secondary cases)

Disease outcomes reported by authors (e.g. Morbidity, mortality, economic outcomes)

Contributing factors

Factors contributing to program success specifically identified by authors

Factors contributing to program failure specifically identified by authors

Conclusions

Authors conclusions

Reviewers conclusions

JBI Data Extraction Form for Economic Evaluations

Reviewer Date

Author Year

Journal Record Number

Method of Evaluation Cost Minimisation Cost Effectiveness
 Cost Utility Cost Benefit

Interventions

Comparator

Setting

Geographical

Participants

Source of effectiveness data

Authors Conclusions

Reviewers Comments

Extraction Complete

Yes

No