



**Government
of South Australia**

SA Health

South Australian Arbovirus Coordinated Control and Operations Plan

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PURPOSE

1. The South Australian Arbovirus Coordinated Control and Operations Plan (the plan) was prepared to provide clear direction for mosquito management to reduce the risk of human cases of arboviral infection such as Murray Valley encephalitis virus (MVEv) and Kunjin virus (KUNv) in South Australia (SA). The plan guides collaboration between relevant state and local government agencies in South Australia in the areas of mosquito surveillance, management and control.

PREFACE

2. The plan establishes procedures for SA Health officers to implement coordinated mosquito control programs when the risk of human cases of MVEv or KUNv infection is high. The plan also outlines the responsibilities, authorities, and the mechanisms to minimise, manage and recover from an outbreak of MVEv or KUNv infection in South Australia.
3. This plan does not establish procedures for exotic vector and/or arbovirus incursions; rather it focuses on the current vectors and arboviruses of concern in South Australia. In the event of exotic vector and/or arbovirus incursion, sections of this plan may guide an appropriate response.
4. Mosquitoes are vectors of a number of arthropod borne viruses (arboviruses) affecting humans. Mosquito borne arboviruses are further classified as either flaviviruses or alphaviruses. In South Australia flaviviruses, including MVEv and KUNv, are of particular concern as they can cause permanent neurological disease or death. Alphaviruses, including Ross River virus (RRv) and Barmah Forest virus (BFv) are also of particular concern in South Australia as they can cause joint inflammation and pain, fatigue and muscle aches, sometimes with intermittent symptoms lasting over a year or more. The detrimental impacts of these diseases on human health and well-being, productivity, use of healthcare resources and regional economies is significant.
5. There is no specific antiviral treatment for these diseases and no vaccine available to prevent infection. Therefore, a coordinated mosquito control plan is crucial to minimise the number of human arbovirus cases in high risk locations.
6. The plan relies on strong cooperative, coordinated and consultative relationships among state and local government agencies. State and local government should maintain effective relationships with other service providers through official agreements or understandings, to ensure an efficient and coordinated response can be made to any mosquito borne disease outbreak. State and local government agencies acting to prevent, respond to and recover from mosquito borne disease outbreaks in South Australia should prepare their plans giving regard to the Public Health Emergency Management Plan (PHEMP).
7. The plan guides the implementation of coordinated mosquito control programs designed to significantly reduce mosquito numbers in targeted areas, thus aiming to minimise the incidence of serious mosquito borne human flavivirus infection in South Australia.

8. The plan also guides appropriate chemical treatment of mosquito breeding and harbouring locations in regions where the presence of serious human flaviviruses has been confirmed.
9. The implementation of the plan should occur each mosquito season. However, a heightened response, as outlined by the plan, will only occur when the risk of an outbreak of serious human arboviruses is high and it is unlikely routine mosquito control programs will be sufficient to protect public health. Outbreaks of arboviral disease typically occur over an extended period following prolonged periods of increased rainfall, above average temperatures and an abundance of vector hosts. As a consequence, the response to an outbreak can be similarly extended over a period of time (up to months).
10. The plan provides the framework for the implementation of coordinated mosquito control programs. It does not provide detailed instructions or technical information on how surveillance and control activities are to be carried out.

REVIEW OF THE SOUTH AUSTRALIAN ARBOVIRUS COORDINATED CONTROL AND OPERATIONS PLAN

11. The Manager of Health Protection Programs, Public Health and Clinical Systems, is responsible for the preparation and review of the plan. Its strategies will be administered by SA Health.

Responsibility for the coordination, maintenance and distribution of amendments to the plan lies with:

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Public Health and Clinical Systems
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LEGAL AND ADMINISTRATIVE FRAMEWORK

Relevant legislation

12. *South Australian Public Health Act 2011* (the Act)
Emergency Management Act 2004 (SA)

Off-target effects caused by mosquito control activities, including pesticide use, are regulated by various Acts not discussed in the plan.

South Australian Public Health Act 2011

13. The Act promotes and provides for the protection of the public in South Australia and the reduction of the incidence of preventable illness, injury and disability.

The Act also outlines that, with the approval of the Minister for Health and following consultation with the Chief Public Health Officer and State Coordinator, the Chief Executive of the Department of Health and Ageing may declare a public health emergency. This declaration empowers the Chief Executive to take necessary action to implement the Public Health Emergency Management Plan and, by extension, the plan.

The Department for Health and Ageing is the administrative unit of the public service that is, under the Minister for Health and Ageing, responsible for the administration of the *South Australian Public Health Act 2011*.

Emergency Management Act 2004 (SA)

14. The *Emergency Management Act 2004* establishes strategies and systems for the management of emergencies in the state.

The Emergency Management Unit (EMU) is the business unit of the Department for Health and Ageing responsible for the administration of relevant health aspects for the *Emergency Management Act 2004*.

Relationship of South Australian Arbovirus Coordinated Control and Operations Plan to State Plans

Public Health Emergency Management Plan (PHEMP)

15. The Public Health Emergency Management Plan (PHEMP) outlines the responsibilities, authorities and mechanisms to minimise, manage and recover from declared or undeclared Public Health Incidents or Public Health Emergencies within South Australia. The PHEMP is relevant to any Public Health Incidents or Public Health Emergencies in accordance with the *South Australian Public Health Act 2011*.

Human Disease Hazard Plan

16. The Human Disease Hazard Plan is a plan developed to minimise morbidity and mortality within the South Australian population. The Human Disease Hazard Plan identifies the systems and processes that need to be in place to manage the health related risk to critical infrastructure and essential services in South Australia, and aims to minimise disruption to the State's function and economy. The Human Disease Hazard Plan is intended for reference and use by relevant Commonwealth, State and Local Government agencies for the effective management of a human disease hazard event.

DEFINITIONS

Definitions of the South Australian Arbovirus Coordinated Control and Operations Plan

17. The South Australian Arbovirus Coordinated Control and Operations Plan is a plan prepared for the Chief Executive and approved by the Minister for Health, comprising of strategies to be administered by SA Health for mosquito control and the prevention of the spread of serious human arboviral disease.

Definition of affected area

18. The South Australian Arbovirus Coordinated Control and Operations Plan is a state wide plan with a particular focus on the areas adjoining the River Murray from Goolwa to the Victorian border. These include but are not limited to the Alexandrina Council, the Berri Barmera Council, the Coorong District Council, the District Council of Loxton Waikerie, the Mid Murray Council, the Renmark Paringa Council, the Rural City of Murray Bridge, and the regions outside of council areas of South Australia.

Definition of the problem

19. The broad areas of flood plain associated with the River Murray provide prolific breeding opportunities for the main MVEv vector mosquito, *Culex annulirostris*, particularly after a period of high and prolonged river flow when flood waters recede, and during times of high spring and summer rainfall. South Australian human cases of MVEv infection in 1974 and 2011 followed periods of exceptionally high and prolonged river flow.

Definition of public health

20. In accordance with the *South Australian Public Health Act 2011*, public health means the health of individuals in the context of the wider health of the community.
21. Within SA Health, responsibility for and oversight of public health issues falls within the System Performance and Service Delivery division. Relevant units in the division include:
- **Office of the Chief Public Health Officer (CPHO):** Advises the Minister for Health and the Chief Executive of SA Health about proposed legislative or administrative changes related to public health and about other matters relevant to public health. The office oversees public health planning, reporting and evaluation.
 - **Public Health Services:** Undertakes public health strategic planning and reporting, delivers public health services, oversees and maintains public health legislation, provides high level advice on public health issues to the Department for Health and Ageing, the Minister for Health, other government agencies, non-government organisations and the media, and coordinates Health in all Policies across the state and local government agencies.
 - **Communicable Disease Control Branch (CDCB):** Undertakes communicable disease surveillance, public health response services, prevention activities and policy development to minimise the incidences and severity of communicable and infectious diseases in South Australia.
 - **Emergency Management Unit (EMU):** Provides strategic leadership and direction for the implementation and management of SA Health's response to major incidents, emergencies and disasters to ensure the Department for Health and Ageing fulfils its role in any of these events that may occur in the state, nationally or internationally.

MOSQUITO MANAGEMENT RESPONSIBILITIES

22. SA Health is the lead control agency in South Australia for human disease epidemics, including outbreaks of serious human arboviral disease. Local councils are responsible for implementing mosquito surveillance and control programs on public land (including Crown land) within their council area for public health protection purposes.
23. At level 2 of the Hierarchy of Response (HoR) for mosquito control programs (refer to 'Hierarchy of Response for Mosquito Control' on page 12), SA Health's primary role is to support local council run mosquito surveillance and control programs. At level 3 of the HoR, SA Health's role is to coordinate and support local council mosquito control programs in targeted high risk locations.
24. In the unincorporated areas of South Australia (areas outside of local government jurisdiction) any reference in the plan to the roles and responsibilities of local councils shall be taken to be the roles and responsibilities of SA Health's Health Protection Operations section.
25. Private land owners are responsible for preventing the creation of potential mosquito breeding sites and applying appropriate mosquito control measures on their properties when necessary. Individuals are responsible for implementing personal and household protection measures for mosquitoes and the elimination of potential mosquito breeding sites around the home.
26. SA Health provides health promotion information and resources to relevant councils through the 'Fight the Bite' campaign. This campaign provides resources and radio advertisements for the general public on how best to protect against mosquito-borne diseases. Campaign resources are distributed to relevant councils and radio advertising is broadcast on local radio stations in affected areas.

PREPAREDNESS AND PLANNING

Mosquito and Arboviral Intelligence Sources

27. Public health arboviral surveillance is conducted to identify high risk periods and locations, providing opportunities to intervene (through mosquito control and health promotion) to prevent or reduce human cases of infection. Surveillance activities include adult and larval mosquito monitoring, species identification, viral screening of adult mosquitoes, sentinel chicken surveillance, and the use of mosquito traps containing honey coated DNA/RNA preservation FTA[®] cards.

Climatic Forecasts

28. The surveillance of meteorological/environmental data is used in the prediction of MVEv by signalling conditions associated with previous outbreaks of MVEv disease in humans. Rainfall patterns, temperature, and river flows are examined. Weather conditions and the ENSO forecaster are monitored via the Bureau of Meteorology.
29. The Forbes and Nicholls hypotheses, two predictive models utilising various meteorological data, are available to provide an indication of the likelihood of human cases of MVEv infection in south eastern Australia.

Mosquito Trapping and Viral Screening

30. From September to April, the Mosquito and Public Health Research Group of the University of South Australia (UniSA), under contract to some local councils, conducts monthly adult mosquito trapping and larval surveillance along the River Murray in South Australia and fortnightly in the northern Adelaide metropolitan area.
31. During the same period, Health Protection Programs, SA Health conducts monthly adult trapping in six locations in northern metropolitan Adelaide.
32. In addition to species identification, trapped adult mosquitoes can be screened for a range of viruses including RRv, BFv, MVEv, KUNv and Sindbis virus. The trapping of adult mosquitoes and larval surveillance determines the relative abundance and species composition of mosquito populations.

Sentinel Chicken Surveillance

33. The South Australian Sentinel Surveillance Program, coordinated by SA Health, consists of five backyard flocks of five chickens located along the River Murray in South Australia in Paringa, Loxton, Waikerie (Qualco), Murray Bridge and Meningie. Blood samples are collected from the chickens and screened for MVEv and KUNv antibodies on a monthly basis throughout the peak mosquito season (October – April). Samples can be collected more frequently during high risk periods.

FTA[®] Cards

34. The use of FTA[®] cards for mosquito surveillance is a reasonably new technology and can be used to detect both flaviviruses and alphaviruses. Whilst this technology is still being validated, it may provide a more sensitive and cost effective alternative to the viral screening of adult mosquitoes and sentinel chicken surveillance.

Tracking of Reservoir Migratory Patterns

35. The Rufous Night-Heron is considered a significant reservoir of MVEv therefore knowledge of population levels and migratory patterns in a given season may be useful in determining the potential risk of human MVEv cases. Health Protection Programs staff will endeavour to obtain census data on the Rufous Night-Heron from the Department of Environment, Water and Natural Resources (DEWNR) when it is available.

Animal Arboviral Outbreak Information

36. The Department of Primary Industries and Regions South Australia (PIRSA) – Animal Health Branch personnel detect flavivirus in domestic and native animals on occasion as part of disease investigations. Health Protection Programs will be notified by PIRSA if any detection of flavivirus is reported.

Notifiable Human Disease Data

37. SA Health's CDCB collects data on confirmed human cases of notifiable diseases including arboviral diseases such as MVEv, KUNv, RRv, and BFv. However, at present SA Pathology has temporarily suspended the RRv and BFv virus IgM testing due to unusually high positive rates suspicious of false positive results. Until such time as this is resolved, a serological diagnosis of RRv and BFv infection can only be made by evidence of an IgG seroconversion or rising IgG titres in paired specimens collected 2-4 weeks apart. Given the need for multiple specimens, many cases would not be formally diagnosed.

Ross River Forecaster

38. The Ross River Forecaster (RR Forecaster) was developed by the Mosquitoes and Public Health Research Group at UniSA in conjunction with SA Health. The RR Forecaster can make predictions about the extent of RRv activity in a defined area, such as a local government area (LGA), for a 3 month period. The RR Forecaster provides an indirect estimate of the incidence of RRv infection as a per 100,000 population figure. If the population of the LGA is known, then an estimate of the number of notifications expected during a 3 month period is also provided. Despite having a number of limitations, the RR Forecaster can be used as additional intelligence throughout the mosquito season.

Hierarchy of Response

39. Notified cases of serious human arboviral diseases are rare in South Australia. However, when cases are notified or indicators suggest the risk of cases is high, coordinated state government mosquito control programs are required in order to protect public health.
40. Coordinated state government mosquito control programmes require considerable resources beyond the capacity of local councils. They also require significant planning and preparedness to ensure appropriate response if and when the trigger conditions for level 3 of the HoR are met.
41. The HoR was developed to guide decision making on an appropriate level of response that is proportionate to the risk or incidence of serious human arboviral diseases. The HoR specifies trigger conditions for each level of response and measures that should be considered for implementation at that level.
42. The trigger conditions specified in the HoR will not always happen sequentially. The conditions specified at level 1 will not always precede those specified at level 2, which will not always precede those at level 3. Although certain triggers are noted for the implementation of each level of the HoR, it is up to SA Health to determine when the implementation of each HoR level is appropriate.
43. The HoR is dependent upon ongoing data and trends identified by surveillance and control activities, weather forecasting and disease notifications. Communication between state and local government departments and contractors is necessary for accurate decision making and ensuring correct response levels are implemented. SA Health will declare the response level as low, medium, or high depending on the intelligence received and advice sought by relevant agencies. Level 1 or a low response represents the normal surveillance and control activities during the mosquito season. Levels 2 and 3 are heightened response levels which may require additional resources and coordination by SA Health and the Arbovirus Response Cross Agency Group (ARGAG) representatives (Refer to Appendix A).

Decision making on Level of Preparedness/Response Required

44. The Manager of Health Protection Programs is responsible for ensuring outputs from all sources of intelligence are regularly collated and analysed by Health Protection Programs officers, and a determination is made on whether the trigger conditions for a heightened response have been met.
45. If it is determined that the trigger conditions for level 2 or 3 of the HoR have been met, the Manager of Health Protection Programs shall brief the Director, Health Protection and if necessary, the CPHO and make recommendations on the response options to be activated, consistent with the plan.

Table 1 – Hierarchy of Response for Mosquito Control

Threat Level	Trigger Conditions/Indicators	Graded Response
<p>Level 1 - Low</p>	<p>Trigger examples for a level 1 response:</p> <ul style="list-style-type: none"> • Low/average rainfall during previous spring/summer. • Low/average RRv/BFv case notifications and no cases of MVEv. • Forecast spring/summer rain at average/low levels. • Low/average numbers of vector mosquitos (<i>Culex annulirostris</i>). <p>Level 1 of the HoR is 'business as usual'. Specific example triggers are listed above. However, these are to be used as a guide only. A level 1 response occurs when Health Protection Programs determines there is no indication of a high MVEv risk season and no additional surveillance or control measures are necessary to reduce the risk of human cases of MVEv infection.</p> <p>At a level 1 response, local councils make decisions on control needs and priorities with minimal guidance from SA Health. Assistance from the state government is limited to the provision of the mosquito management subsidy, technical advice, central data management, and assessment and feedback where deemed necessary.</p>	<p>Pre-season Preparation:</p> <ul style="list-style-type: none"> • Ensure all equipment for larvicide/adulticide is ready for use. All chemicals purchased and personal protective equipment (PPE) in good condition. • All relevant councils are ready to commence their mosquito surveillance and control programs at the onset of the mosquito season. • Early season meeting to be convened by Health Protection Programs with all councils in risk areas. <p>ARCAG's Role</p> <ul style="list-style-type: none"> • ARCAG meeting conducted at the start of the season and mid-season. All members to be in contact regarding activities that may impact on mosquito surveillance and control. <p>Seasonal Surveillance/activity:</p> <ul style="list-style-type: none"> • Ongoing assessment of monthly mosquito trap data. • Monthly sentinel chicken bleeds. • Ongoing assessment of FTA[®] card results. • December release of Fight the Bite campaign in the media and to all relevant councils/businesses. <p>Other Preparations</p> <ul style="list-style-type: none"> • Release mosquito management subsidy guidelines and reporting requirements prior to the season (August).

Level 2 - Medium	<p>Trigger examples for a level 2 response:</p> <ul style="list-style-type: none"> • Above average rainfall during previous spring/summer, particularly if in association with a strong La Niña event. • Above average RRv/BFv case notifications in high risk MVEv locations. • Forecast spring/summer rain at above average levels, particularly if in association with a strong La Niña event. • High levels of rainfall during spring and/or summer, particularly if in association with a strong La Niña event. • Above average numbers of vector mosquitos (<i>Culex annulirostris</i>). • The detection of MVEv or KUNv in south eastern Australia, particularly in SA or in Victoria close to the SA border, during the current or previous season. • 1 or more human cases of MVEv or KUNv infection in south eastern Australia, particularly in SA or in Victoria close to the SA border in the previous season. <p>Level 2 is considered to be a heightened response. Specific example triggers are listed above. However, these are to be used as a guide only. A level 2 response will be declared when Health Protection Programs determines indicators suggest there is/will be a high MVEv risk and additional mosquito surveillance and/or control measures are necessary to reduce the risk of human MVEv cases.</p> <p>At a level 2 response, local councils make decisions on control needs and priorities with a high level of coordination, guidance and assistance form SA Health. Priority will be to identify and treat mosquito breeding locations in areas where the risk of serious human arboviruses is high. Control efforts will focus on the highest priority areas and may include state government coordinated larviciding.</p>	<ul style="list-style-type: none"> • SA Health to brief CPHO and ARCAG on heightened risk and contingency planning. • CPHO to offer, assess and grant subsidy pre approval to targeted local councils. • Increase the ‘Fight the Bite’ media coverage and resource distribution. • Media releases. • Public Health Alerts. • Consider intensification of sentinel chicken and FTA[®] card programs. • Consider viral screening of trapped mosquitos. • Consider state coordinated targeted larviciding in high risk areas. <p>ARCAG’s Role</p> <ul style="list-style-type: none"> • ARCAG to be convened more frequently as deemed appropriate/necessary. • Primary role is to provide advice and assistance to SA Health in preparation for a possible state coordinated response.
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<p>Level 3 - High</p>	<p>Trigger for a level 3 response:</p> <ul style="list-style-type: none">• 1 or more human cases of Murray Valley encephalitis or Kunjin virus infection. <p>Level 3 is the highest level of response and will only be declared by Health Protection Programs following the notification of one or more human case of MVEv or KUNv infection.</p> <p>At a level 3 response SA Health will coordinate and support local council mosquito control programs in targeted high risk locations.</p>	<p>As for level 2, plus:</p> <ul style="list-style-type: none">• Consider implementation of state coordinated application of adulticides in targeted areas.• Consider intensification of state coordinated targeted larviciding.• Possible transition to PHEMP. <p>ARCAG's Role</p> <p>As for level 2, plus:</p> <ul style="list-style-type: none">• Primary role is to support SA Health to implement a state coordinated response through:<ul style="list-style-type: none">○ Contingency planning.○ Provision of strategic and practical advice to relevant agencies and organisations.• ARCAG will help with the transition to the PHEMP if/when a public health incident or emergency is declared under the provisions of the <i>South Australian Public Health Act 2011</i>.
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RESPONSE AND OPERATIONAL PROCEDURES

Local Government Mosquito Control Programs

46. Mosquito control programs run by individual local councils are the primary means of achieving effective control of mosquitoes in high risk areas during levels 1 and 2 of the HoR. Local government mosquito control programs will be incorporated into a state coordinated response should the trigger conditions for level 3 of the HoR be met.
47. Local councils are responsible for the planning and execution of mosquito control programs within their council area. This includes surveillance of mosquito prone areas, obtaining mosquito control resources, making decisions on priority areas to be treated and ensuring appropriate control measures are implemented. Control measures used in routine local government mosquito control programs are usually limited to ground based application of larvicides and implementing engineering controls where deemed appropriate.
48. Local councils shall determine how best to implement mosquito surveillance and control activities on public lands in their area. Neighbouring councils should seek to coordinate their mosquito surveillance and control activities. Private landholders are responsible for carrying out appropriate mosquito control measures as necessary on their land. The role of local councils in relation to mosquito control on private land includes education, encouragement and, where necessary, enforcement.
49. Local government mosquito control programs will escalate with successively higher levels of the HoR as follows:
 - Level 1 – Local councils make decisions on control needs and priorities with minimal guidance from SA Health. Assistance from the state government is limited to the provision of the mosquito management subsidy, technical advice and central data management and assessment.
 - Level 2 – Local councils make decisions on control needs and priorities but with a high level of guidance and assistance from SA Health. The priority will be to identify and treat mosquito breeding locations in areas where the risk of spread of serious human arboviruses is high. Control efforts will focus on the highest priority areas and may include state government coordinated adulticiding. Considerations for the use of adulticides are discussed in Appendix C.

SA Health will provide or facilitate access to additional control resources to individual councils on a prioritised basis.

Level 3 – State Coordinated Response

50. A state coordinated response is activated when indicators for level 3 of the HoR are present.
51. The purpose of a state coordinated response is to provide additional support and coordination of local government mosquito control programs to ensure the problem is tackled on a regional basis. If SA Health deems necessary, the state coordinated response will also include the implementation of ground based applications of adulticides in targeted areas, if approved. Considerations for the use of adulticides are discussed in Appendix C.
52. During a state coordinated response, SA Health should ensure that:
- The need for any additional mosquito control resources and/or assistance is assessed on a priority basis. Additional resource needs may include adulticide/larvicide/pesticide chemicals, licensed pest control operators, equipment and surveillance and treatment staff.
 - Additional staff requirements for field work is assessed and, where required, sourced and engaged. Training and briefing of these additional staff is to be organised. Vehicles, communication equipment, field data capture equipment and accommodation and meals for staff living away from home will also have to be considered.
 - Appropriate mechanisms are provided for councils to share intelligence, coordinate their control activities, and where appropriate, share resources.
 - Reports on the overall situation are provided to local councils, as well as any specific intelligence, information and advice that may assist decision making at the local level.
 - If adulticiding has been approved, the appropriate chemicals are to be purchased and appropriately licensed pest control contractors engaged and briefed. Contractors shall work at the direction of SA Health and will liaise with local government personnel in the areas they are working.
 - If necessary, formal quotes for the supply of mosquito control chemicals are sought from suitable suppliers, in line with SA Health's procurement procedures. Care should be taken to check the ability of potential suppliers to deliver the required amounts of chemical at short notice.
 - If necessary, formal quotes are sought from licensed pest control contractors. Potential providers should be asked about their likely availability during the potential period for control activities, their availability at short notice, and their flexibility in terms of hours worked and locations they are prepared to work in.
 - Pre-approval is sought from the CPHO for the aerial application of mosquito control chemicals, if necessary.

Transition to Public Health Emergency Management Plan

53. The purpose of the transition to the PHEMP (see Appendix E) is for the state government to assume direct responsibility for the resourcing and implementation of all mosquito control programs, and to ensure control resources can be applied to the highest priority areas within the shortest possible timeframe. There may be an increased emphasis on the use of adulticides at this stage.

54. The transition to the PHEMP will only be activated during a level 3 response when multiple cases of MVEv or KUNv have been notified and if the situation is such that SA Health believes the number of locally acquired cases of MVEv and/or KUNv reach levels that are beyond the capacity of the ARCAG to effectively manage.

Communication Strategies

55. During a Level 2 or Level 3 response, clear and consistent messages concerning the elevated risk should be communicated to the public and relevant stakeholders. Good communication during such an event is crucial to reduce public anxiety, inform relevant actions and improve the effectiveness of the emergency response.
56. The public should understand that a plan is being followed and be given explanations for various actions being undertaken. One of the primary communication objectives is to instil and maintain public confidence by providing the public with information that addresses their questions, fears and concerns.
57. SA Health has a Communications Action Plan. The action plan is a stand-alone document developed to supplement the hierarchy of response when a Level 2 or Level 3 response is declared. The communications action plan guides SA Health and outlines communication activities during a level 2 or level 3 response.
58. Communication between state and local government agencies and organisations will be primarily via the ARCAG group (refer to Appendix A).
59. ARCAG members are encouraged to develop their own internal communications plan for implementation during a heightened response.

PERSONNEL AND CONTRACTORS

Training and Briefing

60. If implementation of a level 3 state coordinated response is necessary, the provision of training and briefings to additional personnel and contractors may be necessary.
61. The content of training and briefing sessions will vary according to the group present and the extent of the state coordinated response. Sessions will usually include one or more of the following topics:
- Current situation and future projections regarding mosquito populations and arbovirus.
 - Mosquito surveillance and control activities.
 - Record keeping and data handling.
 - Field communication.
 - Work health and safety.
 - Environmental policies.

Authorised Officers

62. A surveillance and control team may at times require the assistance of an authorised officer (pursuant to section 43 or 44 of the *South Australian Public Health Act 2011*) in order to effectively discharge its duties during a state coordinated response. Contractors involved in a state coordinated response may be appointed emergency officers after the declaration of a public health emergency, to enable them to enter private land as required to perform their duties¹.

¹Refer to South Australian Public Health Act 2011, Part 3 – Administration, Section 48 (1), Emergency Officers

SCALING DOWN A RESPONSE

Decision Making

63. SA Health will brief the CPHO and make appropriate recommendations if they believe a response is no longer required or that a lower level of response is appropriate. The CPHO will then decide when and how the response can be concluded.
64. Before concluding a response, information should be gathered from all surveillance systems indicating:
- Human notification data.
 - Sentinel chicken surveillance.
 - Mosquito surveillance and viral analysis.
 - FTA[®] card data.
 - RR Forecaster data.
 - Environmental data, particularly climatic conditions.
 - Any opportune data (e.g. wild bird MVEv load, horse KUNv data etc.)
65. All information should be collated from internal and external stakeholders in order to assess whether the risk of transmission has declined sufficiently to allow the resumption of a low-level response.
66. SA Health will conclude any outbreak response if it is determined the threat of human flavivirus infection is no longer present. However, routine surveillance and control activities will continue.

Debriefs and Reporting

67. The purpose of debriefing is to analyse all information from the response and to identify achievements and lessons learnt. Debriefs assist in the implementation of future responses and should include relevant personnel involved in the response.
68. An initial debrief should be conducted at the conclusion of people's involvement in the response. Where the response has been of a significant size, a final debrief of key staff involved in the response should be held within 4 weeks of the completion of the response.
69. SA Health, with input from all agencies and organisations involved in the response, will prepare a report, detailing information on the conduct of the response and its achievements, lessons learned and recommendations for future responses of this nature. The report will be forwarded to the CPHO, the ARCAG and all other relevant agencies and organisations.

SPECIFIC ROLES AND RESPONSIBILITIES

Arbovirus Response Cross Agency Group (ARCAG)

70. The purpose of the ARCAG group is to provide a mechanism for effective communication amongst key stakeholder agencies and organisations on all aspects of the planning and implementation of coordinated mosquito control programs. Membership and terms of reference are included in Appendix A. The mosquito management roles and responsibilities of ARCAGs key stakeholders are listed in Appendix D.
71. The ARCAG will also assist SA Health to plan and implement a state coordinated response through:
1. Providing advice.
 2. Facilitating access to intelligence, information and resources.
 3. Facilitating communication and decision making within the representative agencies where required
71. The ARCAG will also consider the preparedness of representative agencies, other organisations and the state as a whole to support a state coordinated response should it be necessary, and make appropriate recommendations to government.

Level 1 - Low

72. Level 1 is 'business as usual'. During level 1 ARCAG meets twice during the mosquito season including at the commencement of the season and mid-way through the season. The focus of ARCAGs role is to open lines of communication between all members and their represented agencies and organisations. ARCAG will ensure any information regarding activities that have the potential to impact on mosquito control in the state is shared.

Level 2 - Medium

73. If SA Health determines a heightened level of response is required, the ARCAG members should be notified of the current situation, the prognosis of the season and actions currently being taken to prepare for a possible state coordinated response. The ARCAG should be convened at more frequent intervals during a HoR level 2. The primary role for ARCAG at this level is to provide advice and assistance to SA Health in preparation for a possible state coordinated response. It is at this level that the ARCAG members should also consider their own agency's preparedness to support a state coordinated response, either because of specific responsibilities or a general ability to assist.

Level 3 - High

74. If level 3 of the HoR is to be implemented, the ARCAG members will support SA Health in the implementation of a state coordinated response, and if necessary, contingency planning for transition to the state PHEMP. ARCAG will support SA Health through the provision of advice and practical assistance to the represented agencies wherever possible.

ARCAGs involvement during each level of response is summarised in Appendix B.

ACRONYMS

ARCAG – Arbovirus Response Cross Agency Group

BFv – Barmah Forest virus

CDCB – Communicable Disease Control Branch

CPHO – Chief Public Health Officer

DEWNR – Department of Environment, Water and Natural Resources

EMU – Emergency Management Unit

EPA – Environment Protection Authority

HoR – Hierarchy of Response

KUNv – Kunjin virus

LGA – Local Government Area

MVEv – Murray Valley encephalitis virus

PHEMP – Public Health Emergency Management Plan

PIRSA – Primary Industries and Resources South Australia

RR antibodies – Ross River antibodies

RR Forecaster – Ross River Forecaster

RRv – Ross River virus

UniSA – University of South Australia

APPENDICES

Appendix A– Arbovirus Response Cross Agency Group

Table 2: ARCAG Membership

Agencies & Organisations	Representative
Coordinator - SA Health, Health Protection Programs	
Alexandrina Council	
Berri Barmera Council	
Coorong District Council	
DEWNR	
District Council of Loxton Waikerie	
EPA	
Mid Murray Council	
Murray and Mallee Zone Emergency Management Committee	
PIRSA – Biosecurity SA	
Renmark Paringa	
Rural City of Murray Bridge	
University of South Australia	
SA Health, CDCB	
SA Health, Health Protection Operations	
SA Water	

Terms of Reference

- (1) To provide a mechanism for effective communication amongst key stakeholder agencies and organisations on all aspects of the planning and implementation of coordinated mosquito control programs.
- (2) To assist SA Health to plan and if necessary implement a state coordinated response through:
 - a. Providing advice (technical, operational and strategic).
 - b. Facilitating access to intelligence, information and resources.
 - c. Facilitating communication and decision making within the representative agencies where required to ensure an effective and timely response.
- (3) To consider the preparedness of representative agencies, other organisations and the state as a whole to support a state coordinated response should it be necessary, and make appropriate recommendations to government.

Appendix B - ARCAGs role and level of involvement according to the HoR

Table 3: ARCAGs role during each level of response

HoR Level	ARCAG's Role
1 - Low	<ul style="list-style-type: none"> • ARCAG will meet early season in September, and mid-season in February. • Inventory of resources and support equipment (for all agencies) should be provided at the first ARCAG meeting of each season. • ARCAG will ensure any information regarding activities that could potentially impact on mosquito control in the state is shared. This information sharing is a two way process, and involves consideration of impacts on both mosquito control, and impacts of mosquito control on the activities and responsibilities of represented agencies and organisations.
2 - Medium	<ul style="list-style-type: none"> • ARCAG members should be notified of the current situation, the prognosis of the season and actions currently being taken to prepare for a possible state coordinated response. • ARCAG should be convened at intervals decided by the group in response to the severity of the situation. • ARCAG is to provide advice and assistance to SA Health in preparation for a possible state coordinated response. • ARCAG members should consider their own agency's preparedness to support a state coordinated response.
3 - High	<p>State Coordinated Response</p> <ul style="list-style-type: none"> • ARCAG should be convened at intervals decided upon by the group in response to the severity of the situation. • ARCAG will support SA Health to implement a state coordinated response. • ARCAG will help with contingency planning, strategic and practical advice to all relevant agencies and organisations. <p>Transition to the PHEMP</p> <ul style="list-style-type: none"> • ARCAG will help with the transition to the PHEMP.

Appendix C – Considerations for Adult Mosquito Control

75. The main objective of adult mosquito control is to decrease the risk of a human outbreak of serious mosquito-borne disease. Where appropriate, adulticides should be incorporated into an integrated pest management strategy which also includes other mosquito reduction strategies such as:
- The reduction of mosquito breeding habitats.
 - Larvicide treatment.
 - Personal protective measures, especially for those with significant outdoor exposure.
 - Public information campaigns
76. Adulticiding is supplementary to these measures and should be based on the considerations listed below.

Triggers for adulticiding

77. Adulticide chemicals are non-specific and therefore require careful selection and strictly controlled application based on the nature of their active compound and the circumstances of their proposed use. Due to possible off-target effects, adulticiding should only be considered when there is evidence of mosquito-borne activity at a level suggesting high risk of human infection due to abundant adult vectors and where any potential environmental impacts are deemed acceptable to manage the risks posed.

Where to adulticide

78. The areas to be targeted with adulticides should be adjacent to breeding sites or particular areas that harbour large numbers of adult mosquitoes. However, they should never be used over or immediately adjacent to any water body or water course (including potable water sources or treatment plants). As with all treatment chemicals, care must be taken to ensure the product is used as per label instructions. All pesticides for mosquito control must be Environment Protection Authority (EPA) approved.
79. If there is substantial vegetation bordering roads, pesticides should be applied using backpack sprayers.

Human population density

80. The population density in an area where there is an abundance of adult vectors should be taken into consideration. If the area is rural, not near to any residential dwellings, or there are few people, the cost and potential risks of human transmission may not justify the use of adulticides. If the area is heavily populated, there are stronger indications for considering the use of adulticides.

Local government perspectives on adulticiding

81. Communities have varying perspectives on the benefits of mosquito control and these should be taken into account when deciding to use adulticides. Where possible, it is important that local governments assess their ability to conduct or assist in the coordination of adult mosquito control a head of time. Before using adulticides it is important to consider:

- Who in the community is qualified to apply mosquito control pesticides and what contractual arrangements need to be in place?
- Have the appropriate agencies been informed of the intention to use adulticides?
- Has the community been informed of the intention to use adulticides?
- What equipment is available in the community to conduct adult mosquito control?
- Where are the vector species of mosquitoes located and at what times of the year do they appear?
- Can local government undertake additional surveillance and trapping to help define areas appropriate for adult control when level 2 of the HoR is declared?
- Who will be the lead authority for public health mosquito control (i.e. what is the level of response on the HoR?)?
- How will the community be involved and informed during the decision making process?
- How will media releases and the 'Fight the Bite' campaign be used in the overall mosquito management strategy?
- How will the effectiveness of adult mosquito control be evaluated?

Appendix D – Mosquito management roles and responsibilities of key stakeholders

Department of Environment, Water and Natural Resources (DEWNR)

- Wetland inventories to document the conservation value of wetlands, e.g. Ramsar Convention (to assess environmental significance of the site and hence to treat or not treat).
- Various aspects of coastal and marine matters including coastal management, vegetation, marine, estuary and wildlife conservation and environmental reporting.
- Responsible for the allocation, management and tenure administration of Crown Lands.
- Collection of census data on the Rufous Night-Heron.
- Advisor on ecological issues related to mosquito control.
- Management of parks, including areas of recreation, conservation and wilderness protection.
- Indigenous heritage issues and Land Use Agreements.

Environmental Protection Authority (EPA)

- Investigations of incidents that cause actual or potential serious or material environmental harm and environmental nuisance including harm from the application of pesticides.
- Research and monitoring studies related to environmental impacts from the application of pesticides (e.g. locust spraying in the Flinders Ranges), mosquito habitats in urban wetlands and ambient water quality monitoring using aquatic macro invertebrates as biological indicators of stream health.

Local Government

- Local health authority under the *South Australian Public Health Act 2011*.
- Manage council land for community benefit including mosquito surveillance and control where necessary.
- Forming mosquito management regions where appropriate, e.g. Riverland and South East areas.
- Knowledge of local mosquito-prone areas and species present.
- Public education and promotion of personal/household protection measures.
- Consideration of mosquito related as part of Development Plan Amendments.
- Instruct contractors (e.g. pest controllers, Mosquito Research Laboratory) to undertake site-specific monitoring and control to guide and define integrated mosquito management (IMM) across the local area.

Primary Industries and Resources South Australia (PIRSA)

- Primary pesticide use regulator for the non-commercial sector of SA.
- Biosecurity and standards for rural chemicals including appropriate use of pesticides, e.g. spray drift.
- Agrivet Chemical Information Service for all registered agricultural and veterinary chemicals in Australia which may define the site-specific use of pesticides.
- Assistance and advisory role specific to the use of native fish as mosquito predators, e.g. appropriate species, mechanisms to move fish stocks.

- Flavivirus detection in domestic and native animals.

SA Health

- Responsible for the administration of the SAPH Act 2011 on behalf of the Minister for Health and assigned the power as a designated authority under the Act.
- Protecting and improving the health of all South Australian's by providing leadership in health reform, policy development and planning and direct public health service delivery
- Providing a central coordinating/initiating role in matters related to integrated mosquito management
- Mosquito surveillance and control – Torrens Island and Environs and Out of Council areas.
- Provision of the Mosquito Management Subsidy Fund to local councils
- Provide strategic direction for the control and prevention of disease, and investigation and monitoring of arbovirus activity throughout SA.
- Surveillance of mosquito-borne infections in humans.
- Conduct public awareness campaigns through the Fight the Bite Arbovirus Prevention Program.
- Provide comment on local and state government development plans and planning amendment reports.
- Opportunistic bleeding of sentinel chicken flocks.
- Representation on the National Arbovirus & Malaria Advisory Committee of Communicable Disease Network Australia and enHealth.
- Licensing and education/training of pest control companies and pest management technicians.

SA Water

- Provide water and wastewater services to SA.
- Assist in the expansion and development of the SA water industry.
- Provide technical advice and support in areas such as:
 - water utility operations
 - water resource management
 - engineering services
 - research and laboratory services, including the Australian Water Quality Centre (AWQC).
- Ensure SA Water facilities are not breeding grounds for levels of mosquito populations that are likely to create a nuisance or risk to health.
 - conduct mosquito risk assessments for SA Water land holdings
 - implement IPM programs as appropriate
 - share information with relevant organisations and councils
 - provide contact details to SA Health for SA Water Operations staff and facilitate access to SA Water sites (if required).

University of South Australia (UniSA)

- Research and study various mosquito-related issues, e.g. effectiveness of control methods.
- Provide a service to local councils for mosquito surveillance and control activities.
- Provide advice and knowledge to other stakeholders.
- Provide mosquito related training to local councils, e.g. Environmental Health and Plant and Animal Control employees.

Appendix E – PHEMP Overview

82. The PHEMP outlines the responsibilities, authorities and the mechanisms to minimise, or if they occur, manage and recover from, declared or undeclared Public Health Incidents or Public Health Emergencies within South Australia.
83. The plan is intended to be a reference document in the event of a Public Health Incident or Emergency declaration and is to be used by senior members of SA Health as a reference point for actioning response and recovery operations.
84. The PHEMP outlines and informs public health emergency management arrangements at a strategic/state level. The plan will be the main reference document used when the ARCAG determines it no longer has the resources to manage a state coordinated response to an outbreak of MVEv. If it is determined the ARCAG can no longer manage, the EMU of SA Health will become the lead unit and will provide strategic leadership and direction for the implementation and management of SA Health's response to the MVEv outbreak to ensure the department fulfils its role during this event in South Australia.