

****Published July 2013****

MarketVIEW: Ross River Virus vaccines (CAT: VAMV047)

Product Name	:	MarketVIEW: Ross River virus vaccines
Description	:	Global vaccine commercial opportunity assessment
Contents	:	Executive presentation + 1 forecast model
Therapeutic Area	:	Novel vaccines
Publication date	:	July 2013
Catalogue No	:	VAMV047

Background

Ross River virus (RRV) is a mosquito borne alphavirus (*Togaviridae*) mainly indigenous to Australia and the Western Pacific region. Infection with the virus can cause joint pain (polyarthritis/arthralgia) in humans which is reported to persist from between 3 months to a year or more. There is no cure for RRV disease, and treatment is confined to the management of pain. In Australia, several thousand cases occur each year with variability across territories.

Due to its high morbidity and impact on quality of life, Baxter Bioscience mainly in concert with Queensland University of Technology, Brisbane have been developing and inactivated Ross River virus vaccine. A first Phase 3 study started in male and female subjects aged >16 years initiated in April 2011 with licensure predicted in 1-2 years.

This **MarketVIEW** product is a comprehensive commercial opportunity assessment detailing the potential market for a Ross River virus vaccine with a patient based value/volume forecast for all Australians and "at risk" areas only to 2030. The potential use of the vaccine in travelling populations is also explored. A discussion is also included with regard to latest epidemiology, clinical development update and rationale for vaccine approach.

Methodology

VacZine Analytics has closely monitored all significant source material pertaining to Ross River virus. Example, secondary source materials used are literature articles, government websites/databases, medical bodies and associations, conference proceedings and previously analyses (where publically available). Previously published research by **VacZine Analytics** in field of endemic/viral vaccines has also been utilised. *****See Bibliography for exact sources.**

PRODUCT CONTENTS:

Published July 2013 (CAT No: VAMV047)

****This product is composed of a model and summary presentation

Contents – Summary presentation (MS PowerPoint based)

Authors Note

Executive summary

Ross River virus vaccine: key model outputs

Ross River virus vaccine: predicted market to 2030 (\$ 000s)

Ross River virus vaccine: predicted volume to 2030 (doses 000s)

Ross River virus vaccine: predicted market to 2030 (\$ 000s) – risk areas

Ross River virus vaccine: predicted volume to 2030 (doses 000s) – risk areas

Ross River virus vaccine: predicted travel market to 2030 (\$ 000s)

Ross River virus vaccine: predicted travel volume to 2030 (\$ 000s)

Ross River virus: Disease background and epidemiology

Ross River virus: geography/countries affected

Ross River virus: historical outbreaks and epidemics 1979 to 1980

Ross River virus: increasing reports of epidemics 1886 to 1998

Ross River virus: current risk map of infection in Australia

Ross River virus: number of notifications (Australia) to 2012

Notifications and notification rates of Ross River virus infections, Australia, 2006-07 by Statistical Division of residence

Ross River virus: notification rates in select jurisdictions 2006-07

Ross River virus: notifications Western Australia, 2011

Ross River virus: notifications Queensland, 1997-2006

Ross River virus: notifications Queensland, 1997-2006 (per district)

Ross River virus: notifications Victoria, 1998-2009

Ross River virus: notifications South Australia, 1992-2003

Ross River virus: New South Wales: 2009-2013

Ross River virus: Tasmania

Ross River virus: notes on transmission

Ross River virus: mosquito vectors

Ross River virus: vertebrate hosts

Ross River virus: diagnosis/antibody prevalence

Ross River virus: clinical aspects

Ross River virus: age/gender of infections

Continued.....

Ross River virus: joint involvement in RRV disease
Ross River virus: economic burde
Ross River virus: importation and spread to other countries
Ross River virus: future trends – climate
Ross River virus: future trends - human and environment interactions
Ross River virus: Summary of vaccine development
Ross River virus: rationale for vaccine development
Ross River virus vaccine: Baxter Bioscience/Univ Queensland
Ross River virus: Phase 1/2 clinical data
Ross River virus: Phase 3 study design
Ross River virus: Six-month safety follow-up study/approval
Ross River virus: antibody-dependent enhancement
Ross River virus vaccine: Modelling commercial potential
Ross River virus vaccine: target product profile (TPP)
RRV vaccine: modelling strategy (endemic Australia)
RRV vaccine penetration rates per territory (Australia)
RRV vaccine: modelling strategy (travellers)
Western travelers: major commercial model assumptions
Travellers to Australia
RRV vaccine: schedule considerations for travelers segment
Example penetration rates of travel vaccines
Bibliography
Disclaimer
About **VacZine Analytics**

PAGES: 64 MS PowerPoint slides, fully referenced/sourced. Available in .pdf form

Contents – Vaccine demand model(s) (MS Excel-based) – 1 model

Title sheet
CHARTS – AUST (comb)
CHARTS – endemic Aust (all)
CHARTS – endemic Aust (risk)
CHARTS – travellers
Travel summary
Aust endemic (all) summary
Aust endemic (risk) summary
Endemic use →
Australia >16 yrs (all)
New South Wales
Victoria
Queensland
West Australia
Tasmania
Northern Territory
Australian capital
Australia >16 yrs (risk)
New South Wales
Victoria



Continued.....

Queensland
West Australia
Tasmania
Northern Territory
Australian capital
Travel use →
US/Canada – Travellers
EU – Travellers
ROW – Travellers
Source material →
Number of cases (Aust)
Hosts
Mosquito vectors
Population (Australia)
Territories total data
Territories risk areas
Travellers per territory.
International travellers
Back page

WORKSHEETS: ~65

PRODUCT COST:

VacZine Analytics will grant a [enter region] license to [enter client name], for the price of:

- USD \$8995.00/ GBP £5995.00[#] (Region license)*

[#] Indicative rate only. Prevailing rate applied to date of transaction.

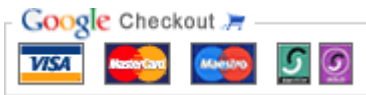
*A region is North America, Europe or ROW

For orders in the UK, VAT at 20.0% will be added to final invoice total

HOW TO ORDER:

To order please contact your region account manager or order direct at orders@vaczine-analytics.com

This report can also be purchased on-line. Please review the **TERMS and CONDITIONS** of purchase.



VacZine Analytics (R) is a trading division of Assay Advantage Ltd, UK Company Number: 5807728

VacZine Analytics (R) and the “**spiral logo**” are UK Registered Trademarks, 2009

BIBLIOGRAPHY:

1. Rulli NE et al. Ross River virus: molecular and cellular aspects of disease pathogenesis. *Pharmacology & Therapeutics* 107 (2005) 329 – 342
2. Weinstein P et al. Biological and cultural coevolution and emerging infectious disease: Ross River virus in Australia. *Medical hypotheses* 76 (2011) 893-896
3. Harley D et al. Ross River virus transmission, infection, and disease: a cross disciplinary review. *Clin. Microbiol. Rev.* 2001, 14(4):909
4. Edwards, A. M. 1928. An unusual epidemic. *Med. J. Aust.* 1:664–665.
5. Aaskov JG, Mataika JU, Lawrence GW, Rabukawaqa V, Tucker MM, Miles JA, et al. An epidemic of Ross River virus infection in Fiji, 1979. *Am J Trop Med Hyg* 1981;30(5):1053e9.
6. Rosen L, Gubler DJ, Bennett PH. Epidemic polyarthritis (Ross River) virus infection in the Cook Islands. *Am J Trop Med Hyg* 1981;30(6):1294e302.
7. Tesh RB, McLean RG, Shroyer DA, Calisher CH, Rosen L. Ross River virus (Togaviridae: Alphavirus) infection (epidemic polyarthritis) in American Samoa. *Trans R Soc Trop Med Hyg* 1981;75(3):426e31.
8. Kelly-Hope LA, Purdie DM, Kay BH. Ross River virus disease in Australia, 1886– 1998, with analysis of risk factors associated with outbreaks. *J Med Entomol* 2004;41:133–50.
9. Ross River virus. Vaccine research fact sheet. University of Sydney, Australia. Available at: http://sydney.edu.au/medicine/news/news/2011/Jul/ross_river.pdf. Accessed: May 2013
10. The Euhuca-Melbourne Collaborative Group. Arbovirus infection in a Murray Valley Community. Part I. Prevalence of antibodies, December,1974. *Med J Aust* 1976;1:257-9.
11. Aaskov JG, Ross P, Davies CEA, Innis MD, Guard RW, Stallman ND, et al. Epidemic polyarthritis in northeastern Australia, 1987– 1979. *Med J Aust* 1981;2:17–9.
12. Australian government. Department of Health and ageing. National notifiable diseases surveillance system. Accessed April 2013
13. COMMUNICABLE DISEASES NETWORK AUSTRALIA. NATIONAL ARBOVIRUS AND MALARIA ADVISOR COMMITTEE ANNUAL REPORT, 2006–07 Available at: [http://www.health.gov.au/internet/main/publishing.nsf/Content/cda-cdi3201-pdf-cnt.htm/\\$FILE/cdi3201d.pdf](http://www.health.gov.au/internet/main/publishing.nsf/Content/cda-cdi3201-pdf-cnt.htm/$FILE/cdi3201d.pdf). Accessed: May 2013
14. Government of Western Australia. Department of Health . Disease watch – July 2012 Available at: http://www.health.wa.gov.au/diseasewatch/vol16_issue3/review_of_notifiable_diseases_2011.cfm Accessed May 2013
15. Queensland government. 2002 to 2006 Notifiable diseases report. Available at: http://www.health.qld.gov.au/ph/documents/cdb/notif_dis_reporth.pdf#page=9. Accessed May 2013
16. Department of Health, Government of Victoria. Annual reports 2009. Vector borne diseases Available at: [http://docs.health.vic.gov.au/docs/doc/24B30C21D7954C70CA2579CD007CA930/\\$FILE/Annual%20report%202009%20vector%20borne.pdf](http://docs.health.vic.gov.au/docs/doc/24B30C21D7954C70CA2579CD007CA930/$FILE/Annual%20report%202009%20vector%20borne.pdf). Accessed May 2013
17. Horwood C et al. The incidence of Ross River virus disease in South Australia, 1992 to 2003. *Communicable Diseases Intelligence*, Volume 29, Issue number 3 - September 2005. Available at: <http://www.health.gov.au/internet/main/publishing.nsf/Content/cda-cdi2903i.htm> Accessed: May 2013
18. New South Whiles Department of Health. Ross River virus infection notifications in NSW residents. Available at: <http://www0.health.nsw.gov.au/data/diseases/rossriver.asp> . Accessed: May 2013
19. Tall JA et al. Ross River virus disease in inland NSW: higher than average notifications in 2007–08. Vol. 21(11–12) 2010 NSW Public Health Bulletin
20. Robertson GJ et al. 2004. Ross River virus and its vectors in Sorell Municipal Area, south-eastern Tasmania, January to March 2002. Available at: <http://www.health.gov.au/internet/main/publishing.nsf/Content/cda-pubs-cdi-2004-cdi2802-htm-cdi2802s.htm>. Accessed: May 2013
21. Bambrick H et al. Climate change impacts on the burden of Ross River virus disease. *Garnaut Climate Change Review*. 2008. Available at: [http://www.garnautreview.org.au/ca25734e0016a131/WebObj/03-BRossRivervirus/\\$File/03-B%20Ross%20River%20virus.pdf](http://www.garnautreview.org.au/ca25734e0016a131/WebObj/03-BRossRivervirus/$File/03-B%20Ross%20River%20virus.pdf). Accessed: April 2013
22. Westley-Wise, V. J., J. R. Beard, T. J. Sladden, T. M. Dunn, and J. Simpson. 1996. Ross River virus infection on the North Coast of New South Wales. *Aust. N. Z. J. Public Health* 20:87–92
23. Cloonan, M. J et al. Acute symptoms and sequelae of Ross River virus infection in South-Western Australia: a follow-up study. *Clin.Diagn. Virol.* 3:273–28
24. Selden, S. M., and A. S. Cameron. 1996. Changing epidemiology of Ross River virus disease in South Australia. *Med. J. Aust.* 165:313–317
25. Tomerini DM et al. (2008). The impact of local government mosquito control programmes on Ross River virus disease in Queensland, Australia. Ph.D. Thesis, Griffith University Queensland

26. Lau C et al. Imported cases of RRV disease in New Zealand-travel medicine perspective. *Travel Medicine and Infectious Disease*. (2012) 10, 129-134
27. Aaskov J. Ross River virus: epidemic polyarthritis. In: Barrett ADT, Stanberry LR, editors. *Vaccines for biodefense and emerging and neglected diseases*. London: Elsevier; 2009. p. 631–44.
28. Woodruff R et al. Climate change impacts on the burden of Ross River virus disease. *Garnaut Climate Change Review*. 2008. Available at: [http://www.garnautreview.org.au/ca25734e0016a131/WebObj/03-BRossRivervirus/\\$File/03-B%20Ross%20River%20virus.pdf](http://www.garnautreview.org.au/ca25734e0016a131/WebObj/03-BRossRivervirus/$File/03-B%20Ross%20River%20virus.pdf). Accessed: April 2013
29. Kistner O, Barrett N, Bruhmann A, Reiter M, Mundt W, Savidis-Dacho H, et al. The preclinical testing of a formaldehyde inactivated Ross River virus vaccine designed for use in humans. *Vaccine* 2007;25:4845–52.
30. Aichinger G et al. Safety and immunogenicity of an inactivated whole virus a vero cell derived Ross River virus vaccine: a randomised trial. *Vaccine* 29 (2011) 9376-9384
31. Clinical trials data. Available at: <http://www.clinicaltrials.gov>. Accessed June 2013
32. Ross River vaccine close. *The West Australian*. May 20th 2013. Available at: <http://au.news.yahoo.com/thewest/a/-/breaking/17244392/ross-river-vaccine-close/>. Accessed: May 2013
33. Linn, M. L., Aaskov, J. G., & Suhrbier, A. (1996). Antibody-dependent enhancement and persistence in macrophages of an arbovirus associated with arthritis. *J Gen Virol* 77, 407–411
34. Australian Bureau of Statistics. Available at: <http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0>. Accessed: May 2013
35. International Visitors in Australia. March 2013. Quarterly Results of the International Visitor Survey. Available at: http://www.ret.gov.au/tourism/research/tra/Documents/International_Visitors_in_Australia_March_Qtr_2013.pdf. Accessed June 2013
36. Intercell AG. Annual General Meeting Presentation. June 25th 2010. Available at: www.intercell.com. Accessed April 2011

TERMS and CONDITIONS:

VacZine Analytics – a trading division of Assay Advantage Ltd UK Company Number: 5807728 (Herein referred to as “The Company”). (Herein [enter client name] to as “The Client”).

1. This finished research product is provided is provided as a Service. Any additional Service required by the client will be subject to a new proposal being prepared.
2. The Service will commence after written (e-mail) or Fax confirmation stating the Client's acceptance of the Service according the description proposed by the Company.
3. **Cancellation policy.** The Company's cancellation policies are in accordance with the EU Consumer Protection (Distance Selling) Regulations 2000 (DSRs). Prior to acceptance of an order the Company will make available written information regarding Clients cancellation rights. This is posted on the Company website and is available for public review.
4. **Cancellation rights:** For finished documents - a Clients cancellation rights will last for **seven working days** counting from the day that the order was concluded. If the Services i.e. provision of the documents has taken place with the Clients agreement before this period the Client's cancellation rights have ended.
5. Invoicing will **100%** after submission of deliverables to the Client in a form reasonably acceptable to the Client.
6. If not purchased on line invoices are payable within **thirty days** of the invoice date.
7. All proposals are quoted in **\$USD dollars or £GBP** and invoices are to be settled in the same currency.
8. The Company agrees not to disclose to any third party confidential information acquired in the course of providing the services listed without the prior written consent of the Client. Exception occurs when the information is already in the public domain or when disclosure is necessary to help the Company's employees and agents with the performance of the Company's obligations to achieve satisfactory completion of the project and approved in writing by the Client.
9. Force Majeure: The Company will not be liable for any delay or failure to perform any obligation under this Agreement insofar as the performance of such obligation is prevented by an event beyond our reasonable control, included by not limited to, earthquake, fire, flood or any other natural disaster, labour dispute, riot, revolution, terrorism, acts of restraint of government or regulatory authorities, failure of computer equipment and failure or delay of sources from which data is obtained.
10. Please also refer to Master **TERMS and CONDITIONS** available upon request.

VacZine Analytics

Warren House
Bells Hill
Bishops Stortford
Herts
CM23 2NN
United Kingdom
Tel: +44 (0) 1279 654514 / +44 (0) 7952470582 / Fax: +44 (0) 1279 655926
E-mail: info@vacZine-analytics.com

About VacZine Analytics:

VacZine Analytics is an established strategic research agency based in the United Kingdom. Its aim is to provide disease and commercial analysis for the vaccine industry and help build the case for developing new vaccines and biologics.

For more information please visit our website www.vacZine-analytics.com

VacZine Analytics (R) is a trading division of Assay Advantage Ltd, UK Company Number: 5807728

VacZine Analytics (R) and "the spiral logo" are UK Registered Trademarks, 2009