



UNIVERSITAS
GADJAH MADA
REFERENCES

- Abeku, T.A., Helinski, M.E.H., Kirby, M.J., Kefyalew, T., Awano, T., Batisso, E., Tesfaye, G., Ssekitooleko, J., Nicholas, S., Erdmanis, L., et al. (2015). Monitoring changes in malaria epidemiology and effectiveness of interventions in Ethiopia and Uganda: Beyond Garki Project baseline survey. *Malaria Journal* 14, 337.
- Ashley, E.A., Pyae Phyo, A., and Woodrow, C.J. (2018). Malaria. *The Lancet*.
- Badland, H.M., Duncan, M.J., Oliver, M., Duncan, J.S., and Mavoa, S. (2010). Examining commute routes: applications of GIS and GPS technology. *Environment Health Preventive Medicine* 15, 327–330.
- Bengtsson, L., Gaudart, J., Lu, X., Moore, S., Wetter, E., Sallah, K., Rebaudet, S., and Piarroux, R. (2015). Using mobile phone data to predict the spatial spread of cholera. *Scientific Reports* 5, 8923.
- Bhatt, S., Weiss, D.J., Cameron, E., Bisanzio, D., Mappin, B., Dalrymple, U., Battle, K.E., Moyes, C.L., Henry, A., Eckhoff, P.A., et al. (2015). The effect of malaria control on *Plasmodium falciparum* in Africa between 2000 and 2015. *Nature* 526, 207–211.
- Burgoine, T., Jones, A.P., Namenek Brouwer, R.J., and Benjamin Neelon, S.E. (2015). Associations between BMI and home, school and route environmental exposures estimated using GPS and GIS: do we see evidence of selective daily mobility bias in children? *International Journal of Health Geographic* 14, 8.
- Burkett-Cadena, N.D., and Vittor, A.Y. (2018). Deforestation and vector-borne disease: Forest conversion favors important mosquito vectors of human pathogens. *Basic and Applied Ecology* 26, 101–110.
- Canier, L., Khim, N., Kim, S., Sluydts, V., Heng, S., Dourng, D., Eam, R., Chy, S., Khean, C., Loch, K., et al. (2013). An innovative tool for moving malaria PCR detection of parasite reservoir into the field. *Malaria Journal* 12, 405.
- Central Intelligence Agency (CIA). The World FactBook. East and Southeast Asia: Cambodia, available online at: <https://www.cia.gov/library/publications/the-world-factbook/geos/cb.html>
- Chaix, B., Kestens, Y., Perchoux, C., Karusisi, N., Merlo, J., and Labadi, K. (2012). An interactive mapping tool to assess individual mobility patterns in neighborhood studies. *American Journal of Preventive Medicine* 43, 440–450.
- Chanda, E., Hemingway, J., Kleinschmidt, I., Rehman, A.M., Ramdeen, V., Phiri, F.N., Coetzer, S., Mthembu, D., Shinondo, C.J., Chizema-Kawesha, E., et al. (2011). Insecticide resistance and the future of malaria control in Zambia. *PLoS ONE* 6, e24336.
- Chanda, E., Ameneshewa, B., Angula, H.A., litula, I., Uusiku, P., Trune, D., Islam, Q.M., and Govere, J.M. (2015). Strengthening tactical planning and operational frameworks for vector control: the roadmap for malaria elimination in Namibia. *Malaria Journal* 14, 302.
- Chaves, L.S.M., Conn, J.E., López, R.V.M., and Sallum, M.A.M. (2018). Abundance of impacted forest patches less than 5 km² is a key driver of the incidence of malaria in Amazonian Brazil. *Science Reports* 8, 7077.
- Cho, G.-H., Rodríguez, D.A., and Evenson, K.R. (2011). Identifying Walking Trips Using GPS Data. *Medicine and Science in Sports and Exercise* 43, 365–372.
- Crawley, M. J. (2007). *The R book*. The Atrium, Southern Gate, Chichester, West Sussex PO19 8SQ, England, John Wiley & Sons Ltd.
- Cui, L., Yan, G., Sattabongkot, J., Cao, Y., Chen, B., Chen, X., Fan, Q., Fang, Q., Jongwutiwes, S., Parker, D., et al. (2012). Malaria in the Greater Mekong Subregion: heterogeneity and complexity. *Acta Tropica*. 121, 227–239.
- Dambach, P., Sié, A., Lacaux, J.-P., Vignolles, C., Machault, V., and Sauerborn, R. (2009). Using high spatial resolution remote sensing for risk mapping of malaria occurrence in the Nouna district, Burkina Faso. *Global Health Action* 2.
- Dondorp, A.M., Nosten, F., Yi, P., Das, D., Phyo, A.P., Tarning, J., Lwin, K.M., Ariey, F., Hanpithakpong, W., Lee, S.J., et al. (2009). Artemisinin Resistance in *Plasmodium falciparum* Malaria. *New England Journal of Medicine* 361, 455–467.
- Duncan, M.J., and Mummery, W.K. (2007). GIS or GPS? A comparison of two methods for assessing route taken during active transport. *American Journal of Preventive Medicine* 33, 51–53.
- Duncan, S., Stewart, T.I., Oliver, M., Mavoa, S., MacRae, D., Badland, H.M., and Duncan, M.J. (2013). Portable global positioning system receivers: static validity and environmental conditions. *American Journal of Preventive Medicine* 44, e19-29.
- Durnez, L., Mao, S., Denis, L., Roelants, P., Sochantha, T., and Coosemans, M. (2013). Outdoor malaria transmission in forested villages of Cambodia. *Malaria Journal* 12, 329.
- Durnez L, Coosemans M. Residual transmission of malaria: an old issue for new approaches. In: Manguin S, editor. *Anopheles mosquitoes, new insights into malaria vectors*. InTech; 2013. 671–704.
- Edi, C.A.V., Koudou, B.G., Bellai, L., Adja, A.M., Chouaibou, M., Bonfoh, B., Barry, S.J.E., Johnson, P.C.D., Müller, P., Dongus, S., et al. (2014). Long-term trends in *Anopheles gambiae* insecticide resistance in Côte d'Ivoire. *Parasites & Vectors* 7, 500.
- Elgethun, K., Fenske, R.A., Yost, M.G., and Palcisko, G.J. (2003). Time-location analysis for exposure assessment studies of children using a novel global positioning system instrument. *Environmental Health Perspectives* 111, 115–122.



UNIVERSITAS
GADJAH MADA

Investigating human-malaria mosquito contact in time and space using GPS data loggers

AN AIS JULIETTE PEPEY, Dr. dr. Hera Nirwati, M.Kes, Sp.MK, dr. Widya Wasitvastuti, M.Sc, M.Med.Ed, Ph.D
Universitas Gadjah Mada, 2018 | Diunduh dari <http://etd.repository.ugm.ac.id/>

Enge, P., and Misra, P. (1999). Special Issue on Global Positioning System. Proceedings of the IEEE 87, 3–15.

Erhart, A., Ngo, D.T., Phan, V.K., Ta, T.T., Van Overmeir, C., Speybroeck, N., Obsomer, V., Le, X.H., Le, K.T., Coosemans, M., et al. (2005). Epidemiology of forest malaria in central Vietnam: a large scale cross-sectional survey. *Malaria Journal* 4, 58.

Fornace, K.M., Nuin, N.A., Betson, M., Grigg, M.J., William, T., Anstey, N.M., Yeo, T.W., Cox, J., Ying, L.T., and Drakeley, C.J. (2016). Asymptomatic and Submicroscopic Carriage of *Plasmodium knowlesi* Malaria in Household and Community Members of Clinical Cases in Sabah, Malaysia. *The Journal of Infectious Diseases* 213, 784–787.

Franke, J., Gebreslasie, M., Bauwens, I., Deleu, J., and Siegert, F. (2015). Earth observation in support of malaria control and epidemiology: MALAREO monitoring approaches. *Geospatial Health* 10.

Galpern, P., and Manseau, M. (2013). Finding the functional grain: comparing methods for scaling resistance surfaces. *Journal of Landscape Ecology* 28, 1269–1281.

Githeko, A.K., and Ndegwa, W. (2001). Predicting Malaria Epidemics in the Kenyan Highlands Using Climate Data: A Tool for Decision Makers. *Global Change & Human Health* 2, 54–63.

Grenfell, B., and Harwood, J. (1997). (Meta)population dynamics of infectious diseases. *Trends in Ecology & Evolution (Amst.)* 12, 395–399.

Hemming-Schroeder, E., Strahl, S., Yang, E., Nguyen, A., Lo, E., Zhong, D., Atieli, H., Githeko, A., and Yan, G. (2018). Emerging Pyrethroid Resistance among *Anopheles arabiensis* in Kenya. *American Journal of Preventive Medicine* 98, 704–709.

Hii, J., and Rueda, L.M. (2013). Malaria vectors in the Greater Mekong Subregion: overview of malaria vectors and remaining challenges. *The Southeast Asian Journal of Tropical Medicine and Public Health* 44 Suppl 1, 73–165; discussion 306–307.

Huang, Z., and Tatem, A.J. (2013). Global malaria connectivity through air travel. *Malaria Journal* 12, 269.

Imwong, M., Suwannasin, K., Kunsol, C., Sutawong, K., Mayxay, M., Rekol, H., Smithuis, F.M., Hlaing, T.M., Tun, K.M., van der Pluijm, R.W., et al. (2017). The spread of artemisinin-resistant *Plasmodium falciparum* in the Greater Mekong subregion: a molecular epidemiology observational study. *Lancet Infectious Diseases* 17, 491–497.

Incardona, S., Vong, S., Chiv, L., Lim, P., Nhem, S., Sem, R., Khim, N., Doung, S., Mercereau-Puijalon, O., and Fandeur, T. (2007). Large-scale malaria survey in Cambodia: Novel insights on species distribution and risk factors. *Malaria Journal* 6, 37.

Jansen, M., Kamphuis, C.B.M., Pierik, F.H., Ettema, D.F., and Dijkstra, M.J. (2018). Neighborhood-based PA and its environmental correlates: a GIS- and GPS based cross-sectional study in the Netherlands. *BMC Public Health* 18, 233.

Jiménez-Meza, A., Arámburo-Lizárraga, J., and de la Fuente, E. (2013). Framework for Estimating Travel Time, Distance, Speed, and Street Segment Level of Service (LOS), based on GPS Data. *Procedia Technology* 7, 61–70.

Jones, A.P., Coombes, E.G., Griffin, S.J., and van Sluijs, E.M. (2009). Environmental supportiveness for physical activity in English schoolchildren: a study using Global Positioning Systems. *International Journal of Behavioral Nutrition and Physical Activity* 6, 42.

Kerr, J., Duncan, S., Schipperijn, J., and Schipperijn, J. (2011). Using global positioning systems in health research: a practical approach to data collection and processing. *American Journal of Preventive Medicine* 41, 532–540.

Killeen, G.F. (2014). Characterizing, controlling and eliminating residual malaria transmission. *Malaria Journal* 13, 330.

Kynast-Wolf, G., Hammer, G.P., Müller, O., Kouyaté, B., and Becher, H. (2006). Season of death and birth predict patterns of mortality in Burkina Faso. *International Journal of Epidemiology* 35, 427–435.

Lambin, E.F., Tran, A., Vanwambeke, S.O., Linard, C., and Soti, V. (2010). Pathogenic landscapes: Interactions between land, people, disease vectors, and their animal hosts. *International Journal of Health Geographics* 9, 54.

Leang, R., Taylor, W.R.J., Bouth, D.M., Song, L., Tarning, J., Char, M.C., Kim, S., Witkowski, B., Duru, V., Domergue, A., et al. (2015). Evidence of *Plasmodium falciparum* Malaria Multidrug Resistance to Artemisinin and Piperaquine in Western Cambodia: Dihydroartemisinin-Piperaquine Open-Label Multicenter Clinical Assessment. *Antimicrobial Agents and Chemotherapy* 59, 4719–4726.

Lindsay, S.W., Bødker, R., Malima, R., Msangeni, H.A., and Kisinza, W. (2000). Effect of 1997-98 El Niño on highland malaria in Tanzania. *Lancet* 355, 989–990.

Liu, J., and Chen, X.-P. (2006). Relationship of remote sensing normalized differential vegetation index to Anopheles density and malaria incidence rate. *Biomed. Environ. Sci.* 19, 130–132.

Ministry of Environment of Cambodia (2011). Cambodia Human Development Report Building Resilience: The Future of Rural Livelihoods in the Face of Climate Change.

Moiroux, N., Bio-Bangana, A.S., Djènontin, A., Chandre, F., Corbel, V., and Guis, H. (2013). Modelling the risk of being bitten by malaria vectors in a vector control area in southern Benin, West Africa. *Parasitic Vectors* 6, 71.



UNIVERSITAS
GADJAH MADA

Investigating human-malaria mosquito contact in time and space using GPS data loggers

ANALIS JULIETTE PEPEY, Dr. dr. Hera Nirwati, M.Kes, Sp.MK, dr. Widya Wasitvastuti, M.Sc, M.Med.Ed, Ph.D
Universitas Gadjah Mada, 2018 | Diunduh dari <http://etd.repository.ugm.ac.id/>

Mzilahowa, T., Chiumia, M., Mbewe, R.B., Uzalili, V.T., Luka-Banda, M., Kutengule, A., Mathanga, D.P., Ali, D., Chipwanyanya, J., Zoya, J., et al. (2016). Increasing insecticide resistance in *Anopheles funestus* and *Anopheles arabiensis* in Malawi, 2011-2015. *Malaria Journal* 15, 563.

Overgaard, H., Ekbom, B., Suwonkerd, W., and Takagi, M. (2003). Effect of landscape structure on anopheline mosquito density and diversity in northern Thailand: Implications for malaria transmission and control. *Landscape Ecology* 18, 605–619.

Noedl, H., Se, Y., Schaecher, K., Smith, B.L., Socheat, D., Fukuda, M.M., and Artemisinin Resistance in Cambodia 1 (ARC1) Study Consortium (2008). Evidence of artemisinin-resistant malaria in western Cambodia. *The New England Journal of Medicine* 359, 2619–2620.

Oliver, M., Badland, H., Mavoja, S., Duncan, M.J., and Duncan, S. (2010). Combining GPS, GIS, and accelerometry: methodological issues in the assessment of location and intensity of travel behaviors. *Journal of Physical Activity and Health* 7, 102–108.

Paaijmans, K.P., Wandago, M.O., Githeko, A.K., and Takken, W. (2007). Unexpected High Losses of *Anopheles gambiae* Larvae Due to Rainfall. *PLOS ONE* 2, e1146.

Parker, D.M., Tripura, R., Peto, T.J., Maude, R.J., Nguon, C., Chalk, J., Sirithiranont, P., Imwong, M., von Seidlein, L., White, N.J., et al. (2017). A multi-level spatial analysis of clinical malaria and subclinical *Plasmodium* infections in Pailin Province, Cambodia. *Heliyon* 3, e00447.

Parsons, M.B., Gillespie, T.R., Lonsdorf, E.V., Travis, D., Lipende, I., Gilagiza, B., Kamenya, S., Pintea, L., and Vazquez-Prokopec, G.M. (2014). Global positioning system data-loggers: a tool to quantify fine-scale movement of domestic animals to evaluate potential for zoonotic transmission to an endangered wildlife population. *PLoS ONE* 9, e110984.

Paz-Soldan, V.A., Stoddard, S.T., Vazquez-Prokopec, G., Morrison, A.C., Elder, J.P., Kitron, U., Kochel, T.J., and Scott, T.W. (2010). Assessing and maximizing the acceptability of global positioning system device use for studying the role of human movement in dengue virus transmission in Iquitos, Peru. *The American Journal of Tropical Medicine and Hygiene* 82, 723–730.

Paz-Soldan, V.A., Reiner, R.C., Morrison, A.C., Stoddard, S.T., Kitron, U., Scott, T.W., Elder, J.P., Halsey, E.S., Kochel, T.J., Astete, H., et al. (2014). Strengths and weaknesses of Global Positioning System (GPS) data-loggers and semi-structured interviews for capturing fine-scale human mobility: findings from Iquitos, Peru. *PLoS Neglected Tropical Diseases* 8, e2888.

Peters, W. (1990). The prevention of antimalarial drug resistance. *Pharmacology & Therapeutics* 47, 499–508.

Phillips, M.A., Burrows, J.N., Manyando, C., van Huijsduijnen, R.H., Van Voorhis, W.C., and Wells, T.N.C. (2017). Malaria. *Nature Reviews Disease Primers* 3, 17050.

Pindolia, D.K., Garcia, A.J., Huang, Z., Fik, T., Smith, D.L., and Tatem, A.J. (2014). Quantifying cross-border movements and migrations for guiding the strategic planning of malaria control and elimination. *Malaria Journal* 13, 169.

Prothero, R.M. (1977). Disease and Mobility: A Neglected Factor in Epidemiology. *International Journal of Epidemiology* 6, 259–267.

Protopopoff, N., Matowo, J., Malima, R., Kavishe, R., Kaaya, R., Wright, A., West, P.A., Kleinschmidt, I., Kisinza, W., Mosha, F.W., et al. (2013). High level of resistance in the mosquito *Anopheles gambiae* to pyrethroid insecticides and reduced susceptibility to bendiocarb in north-western Tanzania. *Malaria Journal* 12, 149.

Qi, F., and Du, F. (2013). Tracking and visualization of space-time activities for a micro-scale flu transmission study. *International Journal of Health Geographics* 12, 6.

Rainham, D., Krewski, D., McDowell, I., Sawada, M., and Liekens, B. (2008). Development of a wearable global positioning system for place and health research. *International Journal of Health Geographics* 7, 59.

Riveron, J.M., Watsenga, F., Irving, H., Irish, S.R., and Wondji, C.S. (2018). High *Plasmodium* Infection Rate and Reduced Bed Net Efficacy in Multiple Insecticide-Resistant Malaria Vectors in Kinshasa, Democratic Republic of Congo. *Journal of Infectious Diseases* 217, 320–328.

Rosewell, A., Makita, L., Muscatello, D., John, L.N., Bieb, S., Hutton, R., Ramamurthy, S., and Shearman, P. (2017). Health information system strengthening and malaria elimination in Papua New Guinea. *Malaria Journal* 16, 278.

Samuelson, Ash E., and Leadbeater, Ellouise (2018). A land classification protocol for pollinator ecology research: An urbanization case study. *Ecology and Evolution* 0.

Saunders, D.L., Vanachayangkul, P., and Lon, C. (2014). Dihydroartemisinin–Piperaquine Failure in Cambodia. *New England Journal of Medicine* 371, 484–485.

Searle, K.M., Lubinda, J., Hamapumbu, H., Shields, T.M., Curriero, F.C., Smith, D.L., Thuma, P.E., and Moss, W.J. (2017). Characterizing and quantifying human movement patterns using GPS data loggers in an area approaching malaria elimination in rural southern Zambia. *Royal Society Open Science* 4.

Sexton, J.O., Song, X.-P., Feng, M., Noojipady, P., Anand, A., Huang, C., Kim, D.-H., Collins, K.M., Channan, S., DiMiceli, C., et al. (2013). Global, 30-m resolution continuous fields of tree cover: Landsat-based rescaling of MODIS vegetation continuous fields with lidar-based estimates of error. *International Journal of Digital Earth* 6, 427–448.



UNIVERSITAS
GADJAH MADA

Investigating human-malaria mosquito contact in time and space using GPS data loggers

ANALIS JULIETTE PEPEY, Dr. dr. Hera Nirwati, M.Kes, Sp.MK, dr. Widya Wasitvastuti, M.Sc, M.Med.Ed, Ph.D
Universitas Gadjah Mada, 2018 | Diunduh dari <http://etd.repository.ugm.ac.id/>

Sharma, V. (2010). Tackling disinterest towards blood donation: need for urgent action. *Indian Journal Medicine Ethics* 7, 175–176.

Silal, S.P., Little, F., Barnes, K.I., and White, L.J. (2015). Hitting a Moving Target: A Model for Malaria Elimination in the Presence of Population Movement. *PLoS ONE* 10, e0144990.

Sinka, M.E., Bangs, M.J., Manguin, S., Rubio-Palis, Y., Chareonviriyaphap, T., Coetzee, M., Mbogo, C.M., Hemingway, J., Patil, A.P., Temperley, W.H., et al. (2012). A global map of dominant malaria vectors. *Parasites & Vectors* 5, 69.

Siraj, A.S., Santos-Vega, M., Bouma, M.J., Yadeta, D., Ruiz Carrascal, D., and Pascual, M. (2014). Altitudinal changes in malaria incidence in highlands of Ethiopia and Colombia. *Science* 343, 1154–1158.

Sluydts, V., Heng, S., Coosemans, M., Van Roey, K., Gryseels, C., Canier, L., Kim, S., Khim, N., Siv, S., Mean, V., et al. (2014). Spatial clustering and risk factors of malaria infections in Ratanakiri Province, Cambodia. *Malaria Journal* 13, 387.

Ssempiira, J., Kissa, J., Nambuusi, B., Mukooyo, E., Opigo, J., Makumbi, F., Kasasa, S., and Vounatsou, P. (2018). Interactions between climatic changes and intervention effects on malaria spatio-temporal dynamics in Uganda. *Parasite Epidemiology and Control*.

Stothard, J.R., Sousa-Figueiredo, J.C., Betson, M., Seto, E.Y.W., and Kabatereine, N.B. (2011). Investigating the spatial micro-epidemiology of diseases within a point-prevalence sample: a field applicable method for rapid mapping of households using low-cost GPS-dataloggers. *Transaction of Royal Society of Tropical and Medicine Hygiene* 105, 500–506.

Sturrock, H.J.W., Roberts, K.W., Wegbreit, J., Ohrt, C., and Gosling, R.D. (2015). Tackling imported malaria: an elimination endgame. *American Journal of the Tropical Medicine and Hygiene* 93, 139–144.

Suzán, G., García-Peña, G.E., Castro-Arellano, I., Rico, O., Rubio, A.V., Tolsá, M.J., Roche, B., Hosseini, P.R., Rizzoli, A., Murray, K.A., et al. (2015). Metacommunity and phylogenetic structure determine wildlife and zoonotic infectious disease patterns in time and space. *Ecology & Evolution* 5, 865–873.

Tatem, A.J., Qiu, Y., Smith, D.L., Sabot, O., Ali, A.S., and Moonen, B. (2009). The use of mobile phone data for the estimation of the travel patterns and imported *Plasmodium falciparum* rates among Zanzibar residents. *Malaria Journal* 8, 287.

Tatem, A.J., Huang, Z., Narib, C., Kumar, U., Kandula, D., Pindolia, D.K., Smith, D.L., Cohen, J.M., Graupe, B., Uusiku, P., et al. (2014). Integrating rapid risk mapping and mobile phone call record data for strategic malaria elimination planning. *Malaria Journal* 13, 52.

Teklehaimanot, H.D., Lipsitch, M., Teklehaimanot, A., and Schwartz, J. (2004). Weather-based prediction of *Plasmodium falciparum* malaria in epidemic-prone regions of Ethiopia I. Patterns of lagged weather effects reflect biological mechanisms. *Malaria Journal* 3, 41.

Thomson, M.C., Doblaz-Reyes, F.J., Mason, S.J., Hagedorn, R., Connor, S.J., Phindela, T., Morse, A.P., and Palmer, T.N. (2006). Malaria early warnings based on seasonal climate forecasts from multi-model ensembles. *Nature* 439, 576–579.

Vanwambeke, S.O., Lambin, E.F., Eichhorn, M.P., Flasse, S.P., Harbach, R.E., Oskam, L., Somboon, P., Beers, S. van, Benthem, B.H.B. van, Walton, C., et al. (2007). Impact of Land-use Change on Dengue and Malaria in Northern Thailand. *EcoHealth* 4, 37–51.

Vazquez-Prokopec, G.M., Stoddard, S.T., Paz-Soldan, V., Morrison, A.C., Elder, J.P., Kochel, T.J., Scott, T.W., and Kitron, U. (2009). Usefulness of commercially available GPS data-loggers for tracking human movement and exposure to dengue virus. *International Journal of Health Geographics* 8, 68.

Vazquez-Prokopec, G.M., Bisanzio, D., Stoddard, S.T., Paz-Soldan, V., Morrison, A.C., Elder, J.P., Ramirez-Paredes, J., Halsey, E.S., Kochel, T.J., Scott, T.W., et al. (2013). Using GPS technology to quantify human mobility, dynamic contacts and infectious disease dynamics in a resource-poor urban environment. *PLoS ONE* 8, e58802.

Walsh, J.F., Molyneux, D.H., and Birley, M.H. (1993). Deforestation: effects on vector-borne disease. *Parasitology* 106 Suppl, S55-75.

Watkins, K., C. Sovann, L. Brander, B. Neth, P. Chou, V. Spoann, S. Hoy, K. Choeun, and C. Aing. 2016. Mapping and Valuing Ecosystem Services in Mondulkiiri: Outcomes and Recommendations for Sustainable and Inclusive Land Use Planning in Cambodia. WWF Cambodia.

Wayant, N.M., Maldonado, D., Rojas de Arias, A., Cousiño, B., and Goodin, D.G. (2010). Correlation between normalized difference vegetation index and malaria in a subtropical rain forest undergoing rapid anthropogenic alteration. *Geospatial Health* 4, 179–190.

Wesolowski, A., Buckee, C.O., Engø-Monsen, K., and Metcalf, C.J.E. (2016). Connecting Mobility to Infectious Diseases: The Promise and Limits of Mobile Phone Data. *Journal of Infectious Diseases* 214, S414–S420.

Wheeler, B.W., Cooper, A.R., Page, A.S., and Jago, R. (2010). Greenspace and children's physical activity: A GPS/GIS analysis of the PEACH project. *Preventive Medicine* 51, 148–152.

World Health Organization (WHO) (2014). Guidance for countries on combining indoor residual spraying and long-lasting insecticidal nets.