Ashdin Publishing
Malaria Chemotherapy, Control & Elimination
Vol. 1 (2012), Article ID 235552, 5 pages
doi:10.4303/mcce/235552

Research Article

Active Case Detection for Malaria Elimination: a Confusion of Acronyms and Definitions

Kelly Sanders, Cara Smith Gueye, Allison A. Phillips, and Roly Gosling

Malaria Elimination Initiative, Global Health Group, University of California, San Francisco, 50 Beale St, San Francisco, CA 94105, USA
Address correspondence to Roly Gosling, goslingr@globalhealth.ucsf.edu

Received 26 February 2012; Revised 18 April 2012; Accepted 10 May 2012

Abstract In order to seek a common term and definition around the topic of active surveillance in malaria, the authors carried out a short survey amongst global malaria workers. Through convenience sampling, respondents were asked to identify terms related to the process of determining whether a case is indigenous or imported and the name given to the measures taken following the identification of a case that aim to identify further cases of asymptomatic infection in the community. Over a 6-week time period, 94 responses were received of whom 88% identified themselves as researchers. The most frequent term given to define the process of identifying origin of the infection was case investigation (40%), while focal screening and treatment (FSaT) (34%) was the most frequently chosen term for the process of identifying further cases following the identification of a locally transmitted case. Although this study used a non-representative sample, it clearly indicates a need to develop common terminology around the topic of active surveillance.

Keywords malaria; elimination; control; surveillance; active; passive; reactive; case detection; case investigation; tools; interventions

1 Introduction

In 2007, Bill and Melinda Gates announced a call-to-action for the eradication of malaria and indicated their commitment to providing support for the process. In response to this ambitious call, many governments, non-governmental organizations (NGO) and private institutions around the world renewed their dedication to decreasing the incidence of malaria. Roll Back Malaria's Scaling Up for Impact program, which currently aims for universal coverage of interventions in endemic countries, implemented by government and NGO work, has achieved great strides in reducing malaria morbidity and mortality [8]. Many mid- to low-endemic countries are now on the cusp of elimination, and such experiences provide continued evidence for the feasibility of "shrinking the malaria map" [1]. New research into the best operational strategies for achieving elimination has shown that elimination is complex and country specific, requiring dedicated financial and human resources [6].

Countries striving for malaria elimination are challenged to implement effective strategies in efficient and cost effective ways. It is critical for national malaria programs to have a firm understanding of the remaining areas of transmission, to promptly diagnose and treat all cases, and to investigate new cases to identify and address potential sources of local transmission and imported cases. Surveillance is also needed to substantiate claims of successful elimination [8]. Active case detection (ACD) is commonly used by malaria control and elimination programs worldwide and is currently recommended by the World Health Organization as a crucial strategy for achieving malaria elimination [6, 10]. Active Case Detection is defined by the World Health Organization as "the operation carried out by surveillance agents who visit every locality in a defined area at regular intervals (usually monthly during the transmission season), in order to enquire for fever cases through individual house visits, and to test for malaria (and treat if positive) each suspected person so discovered" [10].

As countries move along the continuum from control to elimination, active case detection and the subsequent investigation of cases become increasingly more important. The prompt detection and treatment of local cases prevents onward transmission, while rapid identification and treatment of imported cases can reduce the likelihood of re-introduction of malaria. Immediate investigation of cases allows surveillance officers to quickly identify potential foci of transmission, to implement needed preventive measures and to conduct necessary entomological and parasitological surveillance.

In recent times, however, a multitude of descriptive terms for activities related to ACD have been described in the malaria literature [2,3,5]. These activities do not follow the parameters of the WHO definition [10] as they often include the actions taken to identify additional malaria infections in the neighboring area of an index case. The list of commonly used terms includes, but is not limited to: case

investigation, focal screening and treatment, mass screening and treatment, proactive case detection and reactive case investigation. These terms are often used synonymously, but can describe a myriad of activities that may move beyond Active Case Detection as described by the WHO, and cause confusion amongst those working in the malaria world. For example, active case detection in the program in Vanuatu [7] involves screening of all individuals, regardless of symptoms, as compared to the WHO definition that simply includes screening of symptomatic individuals [10]. Brazil, in contrast, uses a form of active case detection that they term "aggressive active case detection," that not only includes monthly testing of all patients who have exhibited a fever since the last visit, but attempts to identify asymptomatic cases through repetitive mass blood surveys [4]. In light of these differences, the Global Health Group at the University of California, San Francisco, sought to better understand the current situation by surveying malaria workers about terminology around case detection and related activities.

2 Methods

A short questionnaire was administered to malaria experts (researchers, policy makers, programmatic staff and non-governmental organization workers) around the world using survey monkey (www.surveymonkey.com/s/caseinvestigation). The web-link to the survey was distributed by email to known malaria stakeholders through informal email networks including the Malaria Elimination Group (www.malariaeliminationgroup.org), the malaria list serve at the London School of Hygiene and Tropical Medicine and posted on the Malaria World blog (www.malariaworld.org/blog). The sample was a convenience sample and was not intended to be representative of parties involved in malaria work internationally. The intention of the study was to illustrate the myriad of terms used to describe certain active case detection strategies.

The survey questioned respondents about their basic demographic details, including age, country or countries of work and residence, current position and type of work and expertise. Additionally, two questions focused on respondents' definitions for types of active surveillance, and are stated below:

(1) Countries that aim for malaria elimination typically conduct investigations as part of their elimination strategy. When a case is detected, either through passive or active case detection, a program officer typically visits the home of the index case to determine if the case is indigenous or imported. This strategy can be described as the follow up procedures that occur when malaria is detected in a person inside a country. This includes gathering information in order to classify a malaria case by origin of infection and to identify potential transmission foci. Please indicate what you would call this strategy.

(2) Additional measures are often also used once the index case has been investigated. For example, some countries conduct focal screening within a certain radius or conduct indoor residual spraying. What do you call this process?

For both questions a list of 11 options were given; case investigation, active case detection, reactive case detection, proactive case detection, reactive case investigation, test, treat, and track, FSaT (focal screening and treatment), MSaT (mass screening and treatment), blood survey, community blood survey, or other. Respondents were allowed multiple answers and had a free text option to write comments or to make an alternative suggestion. Finally, respondents were asked to provide a free-text answer to the following question:

(3) Is there a term that you feel best encompasses all these activities? If yes, please describe.

Respondents were required to complete all questions with the exception of number three above.

Table 1: Age distribution of respondents.

Age (years)	Number	Percent
20–30	13	13.8
30–40	26	27.7
40–50	20	21.3
50–60	19	20.2
60–70	11	11.7
70–80	5	5.3
Total	94	

Table 2: Respondents' area of expertise (94 respondents, multiple responses permitted).

Area of expertise	Number	Percent
Researcher	83	88.3%
Policy expert	9	9.6%
Funder	1	1.1%
Country program officer/manager	4	4.3%
NGO worker	10	10.6%
UN agency employee	2	2.1%
Other	12	12.8%

3 Results and discussion

The questionnaire was active between the 1st of November 2011 to the 15th of December 2011 and a total of ninety-four responses were received. Thirty-two percent of respondents were female. Respondents were fairly evenly distributed between age ranges (see Table 1).

The demographics of the participants are shown in Table 2. Participants were allowed to indicate several areas of expertise. Almost 90% of respondents self-identified as researchers.

Table 3: Respondents' country of work.

Country of residence	Number	Percent
The Americas	**20**	
Brazil	1	1.1
Colombia	2	2.1
Haiti	1	1.1
USA	14	14.9
Venezuela	2	2.1
Australasia	**5**	
Australia	4	4.3
New Zealand	1	1.1
Africa	**21**	
Burkina Faso	2	2.1
Côte d'Ivoire	1	1.1
Ethiopia	2	2.1
Kenya	6	6.4
Nigeria	1	1.1
South Africa	3	3.2
Tanzania	2	2.1
The Gambia	2	2.1
Zambia	2	2.1
Asia-Pacific	**15**	
Cambodia	1	1.1
India	5	5.3
Iran	2	2.1
Japan	1	1.1
Nepal	2	2.1
Pakistan	1	1.1
PR China	1	1.1
Sri Lanka	2	2.1
Europe	**33**	
Denmark	1	1.1
Netherlands	1	1.1
Spain	1	1.1
Sweden	2	2.1
Switzerland	3	3.2
UK	25	26.6
Total	**94**	

Respondents work in thirty-eight different countries, with fifteen respondents describing their work as global, or noted that they work in multiple countries. The sample was heavily weighted towards those living in the UK (25) and the United States (14) (Table 3). Approximately half (43) of the respondents had worked in their current position for 3 years or less. Two (2) respondents had worked for more than 30 years in their position; median length of work was 5 years, but ranged from 0.1–30 years.

Results regarding questions about naming the strategies described in the methods section are shown in Tables 4 and 5. In question one we described the process often called case investigation. The results clearly show that this is an accepted term as it represented 40% of all answers given (Table 4) and 65% of respondents reported the term as at least one of their answers (data not shown).

Table 4: Surveillance strategy 1: process to determine whether a case is indigenous or imported.

Name of surveillance strategy	Number	Percent
Active case detection	18	11.5
Active case detection and investigation	1	0.6
Blood survey	4	2.6
Case follow-up	1	0.6
Case investigation	61	39.1
Case investigation is a component of RCD	1	0.6
Community blood survey	2	1.3
Contact tracing	1	0.6
FSaT (focal screening and treatment)	7	4.5
Mass blood survey	1	0.6
MSaT (mass screening and treatment)	1	0.6
Proactive case detection	3	1.9
Reactive case detection	14	9.0
Reactive case investigation	26	16.7
Test, treat, and track	14	9.0
Track and detect	1	0.6
Total answers given	**156**	

Table 5 shows the broad number of terms used to describe strategy two, the activities that should be carried out as a result of local transmission. The survey offered ten options to choose from, with the additional option to suggest one's own term. In addition to the ten offered, respondents recommended an additional eighteen terms. There was some agreement on the use of focal screen and treat (FSaT) (36% of all responses and 54% of respondents) as the term to best describe strategy two, with reactive case investigation in second place (15% of responses).

Of the many comments received, 56 (60%) of the respondents left comments that varied in length and content. Many reaffirmed their previous votes, while many went into more detail about their decision and wanted to add more detail into the description of what was done in strategy 2, for example, "focal screening, spraying and treatment," "focal screening and treatment (FSaT) if only screening and treatment takes place, and focal control if other interventions (e.g. IRS) are used" and "case investigation, focal screening and vector control (SCIVE)." Others went for broader terms, for example, "PMVC = patient management/vector control," "highly focal malaria control," "indicator case oriented focal screening (ICOFS)" and "case investigation & response." Finally, several alluded to the alphabet soup of acronyms, responding with: "please do not invent any more jargon or abbreviations! I think we already have enough."

As illustrated by the survey, malaria programs and technical advisors use a variety of terms to describe the investigation of an index case as well as the response measures, which may include screening and vector control measures. Although case investigation, focal screening and treatment and several other terms were preferred descriptors,

Table 5: Surveillance strategy 2: the response to a case that is locally transmitted.

Name of strategy	Number	Percent
(Intense) focal intervention/control (if there is an intervention like IRS)	1	0.7
Active case detection	13	9.1
Active case detection and control	1	0.7
Active case detection and investigation	1	0.7
Active infection detection	1	0.7
Blood survey	2	1.4
Case investigation	13	9.1
Case response	1	0.7
Community blood survey	3	2.1
Contact screening	1	0.7
Contain and eliminate	1	0.7
Control measures for spraying, active case detection for screening	1	0.7
Focal control measures	1	0.7
Focal screening and IRS	1	0.7
Focal screening/vector control	1	0.7
Focal spraying	1	0.7
FSaT (focal screening and treatment)	51	35.7
Incidence-based targeting	1	0.7
MSaT (mass screening and treatment)	8	5.6
Outbreak response	1	0.7
Proactive case detection	7	4.9
Reactive case investigation	21	14.7
Remedial measures like mass single dose treatment and cover the population in the area by residual insecticide spraying for prevention of transmission	1	0.7
Semi-active case detection	1	0.7
Surveillance-response	1	0.7
Test, treat, and track	6	4.2
Targeted rapid response	1	0.7
Village mass blood survey	1	0.7
Total answers given	**146**	

the number of differing responses indicates a general lack of standard terminology with which to describe these crucial activities. As the malaria community continues to invest in elimination, researchers, policy leaders and program staff must have a common language to describe activities being used in the field. How can best practices be shared or compared when terms are used without standard definitions?

These standard terms and definitions should be clear, informative and describe in detail the on-going activities of a control program. Thus, the entire process could be called, for example, case investigation and response. The response could then be described, for example, as focal screening, treatment and vector control, depending on what is actually done. Clarification of these terms and corresponding definitions would allow malaria programs to ensure consistent activity programming and better enable the sharing of best practices.

This study has obvious limitations due to the use of a web-based voluntary questionnaire distributed through networks of malaria workers and websites. The number of people that saw and chose not to answer the survey is not known; therefore we cannot demonstrate bias in our sample. Bias is likely, however, as an overwhelming majority of responders were researchers and stated that they worked in the USA and UK. The variety of terms found in the survey may have differed had more programmatic workers answered the survey. In addition, the survey was only in English, thus limiting access to many non-English speaking or reading respondents. However, the survey is illustrative of the problem that surrounds the terminology of actively looking for malaria infections in the community. With our sample that answered we clearly see a range of terminology. This study is not meant to be representative but is meant to stimulate discussion so we can move towards consensus on definitions around active case detection in malaria.

4 Conclusion

Malaria program managers and staff, policy experts, NGO workers and malariologists rely on a common language to describe their work, share experiences, and quantify and improve methods. As the the number of countries moving towards elimination is increasing [9], it is essential for standard terms and definitions be developed. In this non-representative study we discovered that the terms used to describe the investigation and response to an index case are poorly defined. The broad and varied terminology currently in use has the potential to dilute our understanding of the substantial work being done in these countries, and creates significant challenges in comparing strategies across contexts and thus our ability to evaluate their effectiveness. Do other such elimination programs suffer the same problem of multiple terms for strategies? We look to the malaria community and World Health Organization to clarify and standardize terms.

Acknowledgments The Global Health Group is based at the University of California, San Francisco and exists in part to support countries on an evidence-based pathway to elimination. The Global Health Group's work on malaria elimination is funded through grants from the Bill & Melinda Gates Foundation. The authors would like to thank the Global Malaria Programme at WHO for their useful comments.

References

[1] R. G. Feachem, A. A. Phillips, J. Hwang, C. Cotter, B. Wielgosz, B. M. Greenwood, et al., *Shrinking the malaria map: progress and prospects*, Lancet, 376 (2010), 1566–1578.

[2] R. D. Gosling, L. Okell, J. Mosha, and D. Chandramohan, *The role of antimalarial treatment in the elimination of malaria*, Clin Microbiol Infect, 17 (2011), 1617–1623.

[3] B. Greenwood, *Can malaria be eliminated?*, Trans R Soc Trop Med Hyg, 103 (2009), S2–S5.

[4] C. Macauley, *Aggressive active case detection: a malaria control strategy based on the Brazilian model*, Soc Sci Med, 60 (2005), 563–573.

[5] K. Mendis, A. Rietveld, M. Warsame, A. Bosman, B. Greenwood, and W. H. Wernsdorfer, *From malaria control to eradication: the WHO perspective*, Trop Med Int Health, 14 (2009), 802–809.

[6] B. Moonen, J. M. Cohen, R. W. Snow, L. Slutsker, C. Drakeley, D. L. Smith, et al., *Operational strategies to achieve and maintain malaria elimination*, Lancet, 376 (2010), 1592–1603.

[7] National Malaria Strategic Vision 2007–2016, Vanuatu. http://apmen.org/storage/country-partner/Vanuatu%20-%20National-%20Vision%20Statement.pdf (accessed 14 April 2012).

[8] Roll Back Malaria, *The global malaria action plan*. http://www.rollbackmalaria.org/gmap/gmap.pdf (accessed 7 February, 2012), 2008.

[9] The Global Health Group and Malaria Atlas Project, *Atlas of Malaria-Eliminating Countries*, University of California, San Francisco, CA, 2011.

[10] World Health Organization, *Malaria elimination: a field manual for low and moderate endemic countries*, WHO, Geneva, 2007.