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Global **Malaria** Programme

WHO malaria terminology



World Health Organization

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Introduction

Medical language must be adaptable so that it can keep pace with the constant increase of our knowledge and with the continual revision and evolution of our concepts.

Terminology of malaria and of malaria eradication. WHO; 1963

In recent years, there has been a proliferation of new terms in relation to malaria in the scientific literature, the media and technical reports and also of terms with new or modified use and meaning. These changes stem from renewed global interest in malaria elimination and eradication, increasing access to scientific and technical information and faster translation of research findings into evidence-based policies. This proliferation has raised certain difficulties:

- Some new terms are used in several different ways.
- Several similar terms have the same meaning.
- Some terms used to describe malaria interventions have different meanings in other public health programmes.

The situation is generating increasing confusion and misunderstanding, not only in the scientific community and funding agencies but also among public health officials responsible for malaria programmes and policy-makers in malaria-endemic countries. WHO has periodically reviewed the terminology of malaria; however, the latest official publication on this topic dates back to 1963.[1] Several WHO publications in the past 10 years have included glossaries of terms used in malaria surveillance, control and elimination; however, there has been no comprehensive review of the terminology of malaria since the work of the drafting committee in 1963.

On this basis and on the advice of the Malaria Policy Advisory Committee at its seventh biannual meeting in March 2015, the WHO Global Malaria Programme Secretariat decided to update the WHO terminology of malaria as a glossary.

PROCESS

First, a desk review was conducted of terms used in programmes for malaria elimination and eradication that have different definitions and uses. The glossaries and lists of terms and definitions reviewed were those in:

- all WHO publications on malaria since 1995, in addition to those in *Terminology of malaria and of malaria eradication*[1] (16 documents);

- publications by other WHO departments, such as "preventive chemotherapy for neglected tropical diseases" (16 documents); and

- scientific papers with definitions or glossary published during the past 10 years, to identify terms used recurrently that are the same or similar but are given different meanings and also new terms that are given similar meanings (15 publications).

The search revealed 292 terms, which were divided into four groups: elimination (50), vector control (69), surveillance (85) and diagnosis and treatment (88); many terms were relevant to both elimination and surveillance. Initial draft definitions were proposed for each term.

All 292 terms and their definitions were submitted for discussion to the members of the newly formed Drafting Committee on Malaria Terminology, who were asked to classify them into three groups:

- those that were and are still relevant and properly described, to be reviewed to update the language but generally considered "good as they stand";

- those that have been used in the past and have value for historical purposes but are no longer in current use and could be considered for archiving; and

- terms that are relevant today but have taken on a new meaning or different use, which should be reviewed and possibly redefined or at least updated so that the definition reflects their current use.

After the initial individual reviews, the Committee was convened for a consultation in Geneva on 2–3 June 2015, where the members worked in pairs on all terms and presented the results in plenary for review by the whole committee. The work was refined after the meeting, through e-mail exchanges among Committee members, when a concerted effort was made to simplify the definitions as much as possible. As a result, the recommended definitions tended to be short, and explanatory notes were added. After this extensive work, the Drafting Committee considered that 153 terms were properly described, proposed 38 for archiving and identified 101 terms as requiring additional work.

For the 101 terms requiring additional work and external review, WHO set up an online survey to collect expert feedback in a systematic way. A web link was issued to 30 identified institutions or groups (full list in the Acknowledgements), and 47 passcodes ("tokens") dedicated to institutions or groups were sent to the corresponding lead contacts (e.g. chief executive officers, chairs or co-chairs of working groups and directors), who could recruit additional technical resources from their institution or group to participate in the review by sharing the passcode. The input from the reviewers at each institution or group was recorded as a single response with a single token. To facilitate review and feedback, the 101 terms were grouped into four thematic areas: diagnosis and treatment (32 terms), elimination (28 terms), surveillance (21 terms) and vector control (20 terms). Each term had a draft definition and, when appropriate, an explanatory note. For each term and commentary, the reviewer was invited to recommend: retain ("OK"), reject ("omit") or amend ("modify") with a written alternative text.

The survey was carried out between 6 and 26 July 2015. Responses were obtained with 25/47 tokens from 20/30 institutions or groups. A total of 1260 entries were received. The external reviewers found that 884 entries were acceptable, recommended 75 entries for archiving and recommended specific modifications for 301 terms. Only five

terms were marked "OK" by all reviewers: causal prophylaxis, passive case detection, stable transmission, unstable transmission and gonotrophic dissociation.

All inputs were reviewed and compiled by the WHO Global Malaria Programme Secretariat, and the suggested modifications were then submitted to the Drafting Committee for review by e-mail exchange. The consolidated result of this work, in the form of a glossary, was then submitted for final discussion to the Malaria Policy Advisory Committee at its eighth biannual meeting in September 2015. The Committee also discussed the term "malaria case", which had generated significant debate among the members of the Drafting Committee and external reviewers.

The list of terms and definitions resulting from this process is presented in the glossary below, which is posted online on WHO website. It will be updated regularly on the basis of input from WHO technical expert groups and review by the WHO Drafting Committee on Malaria Terminology.

THE SPECIAL CASE OF "MALARIA CASE"

The most difficult definition for review was that of a "malaria case". The complexity of defining this term was already recognized when the first WHO terminology for malaria and malaria eradication[1] was published. In that publication, a case was defined as follows:

> **Case.** An occurrence or instance of infection or disease. The word is so vague that the type of case should always be specified, as, for instance, a malaria case or a fever case.

"Case" is defined generally in Dorland's medical dictionary[2] as follows:

> **Case.** A particular instance of disease; sometimes used incorrectly to designate the patient with the disease

Malaria control programmes typically report the number of "malaria cases" as the number of people presenting with illness diagnosed as malaria infection, consistent with the above definition of an instance of illness or disease linked to infection. With the transition of a malaria programme to elimination, emphasis is shifted to malaria infections that may remain asymptomatic for long periods and contribute to transmission. In the elimination phase, therefore, the term "malaria case" evolves to apply to both symptomatic and asymptomatic infections.

In the current recommendation for parasitological confirmation of malaria when an individual presents with illness that is suspected to be malaria, WHO recommends that all "cases" be confirmed with the available diagnostic tools.

As there was no unanimous agreement on the definition or on a proposal to modify the definition of "case" for the transition from control to elimination, the Drafting Committee decided to propose two options to a wider audience to obtain additional comment:

Draft definition 1: Occurrence of malaria illness or disease in a person in whom the presence of malaria parasites in the blood has been confirmed by parasitological testing.

Note: A malaria case can be classified as suspected, presumed or confirmed and as autochthonous, indigenous, induced, introduced or imported (depending on the origin of infection) or as relapsing.

Draft definition 2: Occurrence of malaria infection (symptomatic or asymptomatic) in a person in whom the presence of parasites in the blood has been confirmed by parasitological testing.

Note: A malaria case can be classified as autochthonous, indigenous, induced, introduced or imported (depending on the origin of infection) or as relapsing.

The results of the external survey, additional review by the Drafting Committee and the advice of the Malaria Policy Advisory Committee showed general consensus for a single definition of "malaria case", as proposed in this glossary, for surveillance purposes, which would be applicable to various areas in countries, including those for malaria elimination. The definition proposed below reflects the action required for malaria elimination, which is increasingly the aims of all malaria programmes within the *Global Technical Strategy for Malaria: 2016–2030*.[3] It has already been adopted and is in widespread use in malaria elimination programmes, with related terms (e.g. "case investigation", "index case", "case follow-up"). It is in line with the requirement that countries report only laboratory-confirmed cases as "malaria cases" and has the advantage of continuity with the definition of the past.

Malaria case. Occurrence of malaria infection in a person in whom the presence of malaria parasites in the blood has been confirmed by a diagnostic test

Note: A suspected malaria case cannot be considered a malaria case until parasitological confirmation. A malaria case can be classified as imported, indigenous, induced, introduced, relapsing or recrudescent (depending on the origin of infection); and as symptomatic or asymptomatic. In malaria control settings, a "case" is the occurrence of confirmed malaria infection with illness or disease. In settings where malaria is actively being eliminated or has been eliminated, a "case" is the occurrence of any confirmed malaria infection with or without symptoms.

There is strong consensus that, to reduce confusion, all malaria data sets should include the malaria case definition.

References

1. Terminology of malaria and of malaria eradication: report of a drafting committee. Geneva, World Health Organization; 1963 (https://extranet.who.int/iris/restricted/bitstream/10665/39007/1/9241540141_eng.pdf).
2. Dorland's Illustrated Medical Dictionary. Philadelphia: Elsevier Saunders; 2012.
3. Global Technical Strategy for Malaria 2016–2030. Geneva: World Health Organization; 2015.

Glossary

adherence	Compliance with a regimen (chemoprophylaxis or treatment) or with procedures and practices prescribed by a health care worker
adverse drug reaction	A response to a medicine that is harmful and unintended and which occurs at doses normally used in humans
adverse event	Any untoward medical occurrence in a person exposed to a biological or chemical product, which does not necessarily have a causal relationship with the product *Note: During malaria interventions, adverse events may be reported following treatment with antimalarial medicines and/or exposure to insecticides. The standard definition in the good clinical practice guidelines of the International Conference on Harmonisation of Technical Requirements for Registration of Pharmaceuticals for Human Use refers to pharmaceutical products only.*
adverse event, serious	Any untoward medical occurrence in a person exposed to a biological or chemical product, which is not necessarily causally related to the product, and results in death, requirement for or prolongation of inpatient hospitalization, significant disability or incapacity or is life-threatening
aestivation	A process by which mosquitoes at one or several stages (eggs, larvae, pupae, adults) survive by means of behavioural and physiological changes during periods of drought or high temperature
age group	Subgroup of a population classified by age. The following grouping is usually recommended: • 0–11 months • 12–23 months • 2–4 years • 5–9 years • 10–14 years • 15–19 years • ≥ 20 years *Note: Reporting on age groups can be modified, as appropriate, to local transmission, whereby certain age groups may be of specific interest (e.g. for passive immunity or assessment of ongoing transmission, 0–5 months and 6–11 months; young migrant work force, ≥ 20–29 years; elderly > 60 years, because of the risk for complications).*
age, physiological	Adult female mosquito age in terms of the number of gonotrophic cycles completed: nulliparous, primiparous, 2-parous, 3-parous et seq. *Note: Vector age is typically assessed by age grading instead of days.*
age-grading, of female adult mosquitoes	Classification of female mosquitoes according to their physiological age (number of gonotrophic cycles) or simply as nulliparous or parous (parity rate) *Note: Vectors are age-graded mainly to assess the impact of environmental changes (natural or intended for control) on vector populations. In epidemiological studies, age-grading of vectors is used to estimate the mean probability of their survival, a key variable for calculating the basic reproduction number, R_0, and vectorial capacity.*

age-grading, of mosquito larvae	Classification of mosquito larvae as instars (development stages) 1, 2, 3 and 4
annual blood examination rate	The number of people receiving a parasitological test for malaria per unit population per year
***Anopheles*, infected**	Female *Anopheles* mosquitoes with detectable malaria parasites
***Anopheles*, infective**	Female *Anopheles* mosquitoes with sporozoites in the salivary glands
anopheline density	Number of female anopheline mosquitoes in relation to the number of specified shelters or hosts (e.g. per room, per trap or per person) or to a given period (e.g. overnight or per hour), specifying the method of collection *Note: This term refers strictly to the population density or abundance of adult female* Anopheles *mosquitoes. Anopheline mosquito density is a highly insensitive measure of malaria transmission.*
anthropophilic	Description of mosquitoes that show a preference for feeding on humans, even when non-human hosts are available *Note: A relative term requiring quantification to indicate the extent of preference for anthropophily versus zoophily; usually expressed as the human blood index (proportion of mosquitoes that have fed on humans out of total fed)*
antimalarial medicine	A pharmaceutical product used in humans for the prevention, treatment or reduction of transmission of malaria
artemisinin-based combination therapy	A combination of an artemisinin derivative with a longer-acting antimalarial drug that has a different mode of action
basic reproduction number	The number of secondary cases that a single infection (index case) would generate in a completely susceptible population (referred to as R_0) *Note: The "adjusted reproduction number", R_c, is the reproduction number in the presence of a range of interventions, e.g. insecticide-treated nets, indoor residual spraying and access to treatment.*
bioassay	In applied entomology, experimental testing of the biological effectiveness of a treatment (e.g. infection, insecticide, pathogen, predator, repellent) by deliberately exposing insects to it *Note: When bioassays are used for periodic monitoring of the continued efficacy of residual insecticide deposits on sprayed surfaces in houses (as in indoor residual spraying), attention should be paid to the environmental conditions and possible adverse factors (e.g. washing, re-plastering, soot) that affect the deposits on treated surfaces; these factors may reduce the effectiveness of treatment differently from the intrinsic rate of decay of the insecticide.*
biting rate	Average number of mosquito bites received by a host in a unit time, specified according to host and mosquito species (usually measured by human landing collection) *Note: Human malariology mainly requires the "human biting rate" of vectors.*
capture site	Site selected for periodic sampling of the mosquito population of a locality for various purposes

case, confirmed	Malaria case (or infection) in which the parasite has been detected in a diagnostic test, i.e. microscopy, a rapid diagnostic test or a molecular diagnostic test *Note: On rare occasions, the presence of occult malaria infection in a blood or organ donor is confirmed retrospectively by the demonstration of malaria parasites in the recipient of the blood or organ.*
case, fever	The occurrence of fever (current or recent) in a person *Note: Fever is often used as a screening criterion before performing a diagnostic test to detect malaria.*
case, imported	Malaria case or infection in which the infection was acquired outside the area in which it is diagnosed
case, index	A case of which the epidemiological characteristics trigger additional active case or infection detection. The term "index case" is also used to designate the case identified as the origin of infection of one or a number of introduced cases.
case, indigenous	A case contracted locally with no evidence of importation and no direct link to transmission from an imported case
case, induced	A case the origin of which can be traced to a blood transfusion or other form of parenteral inoculation of the parasite but not to transmission by a natural mosquito-borne inoculation *Note: in controlled human malaria infections in malaria research, the parasite infection (challenge) may originate from inoculated sporozoites, blood or infected mosquitoes.*
case, introduced	A case contracted locally, with strong epidemiological evidence linking it directly to a known imported case (first-generation local transmission)
case, locally acquired	A case acquired locally by mosquito-borne transmission *Note: Locally acquired cases can be indigenous, introduced, relapsing or recrudescent; the term "autochthonous" is not commonly used.*
case, malaria	Occurrence of malaria infection in a person in whom the presence of malaria parasites in the blood has been confirmed by a diagnostic test *Note: A suspected malaria case cannot be considered a malaria case until parasitological confirmation. A malaria case can be classified as imported, indigenous, induced, introduced, relapsing or recrudescent (depending on the origin of infection); and as symptomatic or asymptomatic. In malaria control settings, a "case" is the occurrence of confirmed malaria infection with illness or disease. In settings where malaria is actively being eliminated or has been eliminated, a "case" is the occurrence of any confirmed malaria infection with or without symptoms.* *For more discussion on "malaria case", see the section on "The special case of malaria case", above.*
case, presumed	Case suspected of being malaria that is not confirmed by a diagnostic test *Note: The designation "presumed case" is reserved for uncommon situations in which a diagnostic test cannot be performed in a timely manner.*
case, recrudescent	Malaria case attributed to the recurrence of asexual parasitemia after antimalarial treatment, due to incomplete clearance of asexual parasitemia of the same genotype(s) that caused the original illness. A recrudescent case must be distinguished from reinfection and relapse, in case of *P. vivax* and *P. ovale*.

case, relapsing	Malaria case attributed to activation of hypnozoites of *P. vivax* or *P. ovale* acquired previously *Note: The latency of a relapsing case can be > 6–12 months. The occurrence of relapsing cases is not an indication of operational failure, but their existence should lead to evaluation of the possibility of ongoing transmission.*
case, suspected malaria	Illness suspected by a health worker to be due to malaria, generally on the basis of the presence of fever with or without other symptoms
case detection	One of the activities of surveillance operations, involving a search for malaria cases in a community *Note: Case detection is a screening process in which the indicator is either the presence of fever or epidemiological attributes such as high-risk situations or groups. Infection detection requires use of a diagnostic test to identify asymptomatic malaria infections.*
case detection, active	Detection by health workers of malaria cases at community and household levels, sometimes in population groups that are considered at high risk. Active case detection can consist of screening for fever followed by parasitological examination of all febrile patients or as parasitological examination of the target population without prior screening for fever. *Note: Active case detection may be undertaken in response to a confirmed case or cluster of cases, in which a population potentially linked to such cases is screened and tested (referred to as "reactive case detection"), or it may be undertaken in high-risk groups, not prompted by detection of cases (referred to as "proactive case detection").*
case detection, passive	Detection of malaria cases among patients who, on their own initiative, visit health services for diagnosis and treatment, usually for a febrile illness
case follow-up	Periodic re-examination of patients with malaria (with or without treatment) *Note: Follow-up may involve blood examination and treatment if the patient did not respond to previous medicines. Case follow-up is part of surveillance.*
case investigation	Collection of information to allow classification of a malaria case by origin of infection, i.e. imported, indigenous, induced, introduced, relapsing or recrudescent *Note: Case investigation may include administration of a standardized questionnaire to a person in whom a malaria infection is diagnosed and screening and testing of people living in the same household or surrounding areas.*
case management	Diagnosis, treatment, clinical care, counselling and follow-up of symptomatic malaria infections
case notification	Compulsory reporting of all malaria cases by medical units and medical practitioners to either the health department or the malaria control programme, as prescribed by national laws or regulations
catchment area	A geographical area defined and served by a health programme or institution, such as a hospital or community health centre, which is delineated on the basis of population distribution, natural boundaries and accessibility by transport

cerebral malaria	Severe *P. falciparum* malaria with impaired consciousness (Glasgow coma scale < 11, Blantyre coma scale < 3) persisting for > 1 hour after a seizure *Note: The initial neurological symptoms are often drowsiness, confusion, failure to eat or drink or convulsions (see current WHO definition of severe malaria in the* Guidelines for the treatment of malaria. 2015, Third edition*).*
certification of malaria-free status	Certification granted by WHO after it has been proved beyond reasonable doubt that local human malaria transmission by Anopheles mosquitoes has been interrupted in an entire country for at least 3 consecutive years and a national surveillance system and a programme for the prevention of reintroduction are in place
chemoprevention, seasonal malaria	Intermittent administration of full treatment courses of an antimalarial medicine during the malaria season to prevent malarial illness. The objective is to maintain therapeutic concentrations of an antimalarial drug in the blood throughout the period of greatest risk for malaria. *Note: This intervention is recommended only for areas with highly seasonal malaria, where transmission occurs during a few months of the year.*
chemoprophylaxis	Administration of a medicine, at predefined intervals, to prevent either the development of an infection or progression of an infection to manifest disease
cluster	Aggregation of relatively uncommon events or diseases in space and/or time in numbers that are considered greater than could be expected by chance
combination therapy	A combination of two or more classes of antimalarial medicine with unrelated mechanisms of action
coverage	A general term referring to the fraction of the population of a specific area that receives a particular intervention
coverage, universal	Access to and use of appropriate interventions by the entire population at risk of malaria
cure	Elimination from an infected person of all malaria parasites that caused the infection *Note: When applied to* P. vivax *and* P. ovale *malaria, the term is equivalent to radical cure.*
cure, radical	Elimination of both blood-stage and latent liver infection in cases of *P. vivax* and *P. ovale* infection, thereby preventing relapses *Note: The term is used only for* P. vivax *and* P. ovale *infections, to reflect the use of anti-hypnozoite medicines.*
cure rate	Percentage of treated individuals whose infection is cured
cyto-adherence	Propensity of malaria-infected erythrocytes to adhere to the endothelium of the microvasculature of the internal organs of the host
diagnosis	The process of establishing the cause of an illness (for example, a febrile episode), including both clinical assessment and diagnostic testing
diagnosis, molecular	Use of nucleic acid amplification-based tests to detect the presence of malaria parasites

diagnosis, parasitological	Diagnosis of malaria by detection of malaria parasites or *Plasmodium*-specific antigens or genes in the blood of an infected individual
diapause	Condition of suspended animation or temporary arrest in the development of immature and adult mosquitoes
dosage regimen (or treatment regimen)	Prescribed formulation, route of administration, dose, dosing interval and duration of treatment with a medicine
dose	Quantity of a medicine to be taken at one time or within a given period *Note: The quantities of antimalarial medicines should be expressed as base (when applicable) and fractions of a gram or milligrams.*
dose, loading	One or a series of doses that may be given at the start of therapy with the aim of achieving the target concentration rapidly
drug efficacy	Capacity of an antimalarial medicine to achieve the therapeutic objective when administered at a recommended dose, which is well tolerated and has minimal toxicity
drug resistance	The ability of a parasite strain to survive and/or multiply despite the absorption of a medicine given in doses equal to or higher than those usually recommended *Note: Drug resistance arises as result of genetic changes (mutations or gene amplification) that confer reduced susceptibility*
drug safety	(See Medicine safety)
drug, gametocidal	A drug that kills male and/or female gametocytes, thus preventing them from infecting a mosquito
drug, schizontocidal	A drug that kills schizonts, either in the liver or the blood
endemic area	An area in which there is an ongoing, measurable incidence of malaria infection and mosquito-borne transmission over a succession of years
endemicity, level of	Degree of malaria transmission in an area *Note: Various terms have been used to designate levels of endemicity, but none is fully satisfactory. Parasite rate or spleen rate has been used to define levels of endemicity in children aged 2–9 years, i.e. hypoendemic: 0–10%; mesoendemic: 10–50%, hyperendemic: constantly > 50% and holoendemic: constantly ≥ 75% with a low adult spleen rate Parasite density decreases rapidly between 2 and 5 years of age.*
endophagy	Tendency of mosquitoes to blood-feed indoors *Note: Contrasts with exophagy*
endophily	Tendency of mosquitoes to rest indoors. *Note: Contrasts with exophily; usually quantified as the proportion resting indoors; used in assessing the effect of indoor residual spraying*
entomological inoculation rate	Number of infective bites received per person in a given unit of time, in a human population *Note: This rate is the product of the "human biting rate" (the number of bites per person per day by vector mosquitoes) and the sporozoite rate (proportion of vector mosquitoes that are infective). At low levels of transmission, the estimated entomological inoculation rate may not be reliable, and alternative methods should be considered for evaluating transmission risk.*

epidemic	Occurrence of a number of malaria cases highly in excess of that expected in a given place and time *Note: Seasonal increases in the incidence of malaria should not be confused with epidemics.*
epidemiological investigation	Study of the environmental, human and entomological factors that determine the incidence or prevalence of infection or disease *Note: In malaria elimination, epidemiological investigation is a part of surveillance operations and involves ascertaining the origin and means of transmission of any malaria case discovered. It involves epidemiological surveys, localized mass blood examinations and entomological surveys to ascertain the existence and nature of any malaria foci in surrounding areas, to establish whether transmission is taking place and, if it is, its source and potential to spread.*
erythrocytic cycle	Portion of the life cycle of the malaria parasite from merozoite invasion of red blood cells to schizont rupture. The duration is approximately 24 h in *P. knowlesi*, 48 h in *P. falciparum*, *P. ovale* and *P. vivax* and 72 h in *P. malariae*.
exophagy	Tendency of mosquitoes to feed outdoors *Note: Contrasts with endophagy; usually quantified as the proportions biting hosts outdoors versus indoors, conveniently assessed by comparative human landing catches outdoors and indoors or by observation of biting rates on non-human hosts outdoors*
exophily	Tendency of mosquitoes to rest outdoors *Note: Contrasts with endophily; usually quantified as proportions resting outdoors and indoors; used in estimating outdoor transmission risks*
experimental huts	For vector investigations, simulated house with entry and exit traps for sampling mosquitoes entering and exiting, blood-feeding indoors (when a host is present) and surviving or dying in each sub-sample, per day or night *Note: Experimental huts are used in standard protocols to evaluate indoor treatments (indoor residual spraying and insecticide-treated nets) against endophilic mosquitoes.*
fixed-dose combination	A combination in which two antimalarial medicines are formulated together in the same tablet, capsule, powder, suspension or granule
focus, malaria	A defined circumscribed area situated in a currently or formerly malarious area that contains the epidemiological and ecological factors necessary for malaria transmission *Note: Foci can be classified as active, residual non-active or cleared.*
gametocyte	Sexual stage of malaria parasites that can potentially infect anopheline mosquitoes when ingested during a blood meal
gametocyte rate	Percentage of individuals in a defined population in whom sexual forms of malaria parasites have been detected *Note: This term is generally used to refer to* P. falciparum. *The detection method used should be mentioned when citing a gametocyte rate. The percentage of cases of falciparum malaria with gametocytes is an indicator of the timeliness of diagnosis and treatment of malaria.*

geographical reconnaissance	Censuses and mapping to determine the distribution of the human population and other features relevant for malaria transmission in order to guide interventions *Note: Geographical reconnaissance provides the basis for selecting field centres and depots, for designing schedules and itineraries of operations, planning deployment of transport and assessing completion of planned activities. It can also be used to define, as accurately as possible, the geographical limits of malaria-endemic areas and to assess epidemic potential.*
gonotrophic cycle	Each complete round of ovarian development in the female mosquito, usually after ingestion of a blood meal, to yield a batch of eggs. Gonotrophic harmony is achieved when every blood meal results in one batch of eggs from the gonotrophic cycle. *Note: Temperature and other environmental factors affect the duration of the gonotrophic cycle, which takes a few days or weeks, strongly influencing vectorial capacity. Before completion of the first gonotrophic cycle, the adult female mosquito is nulliparous; after laying eggs, she is parous; after successive gonotrophic cycles, she is primiparous, 2-parous, 3-parous, 4-parous, et seq.*
gonotrophic discordance (dissociation)	Female mosquitoes that take more than one blood meal per gonotrophic cycle
hibernation	Process in which mosquitoes at one or several stages (eggs, larvae, pupae, adults) survive by means of behavioural or physiological changes during cold periods
house	Any structure other than a tent or mobile shelter in which humans sleep
household	The ecosystem, including people and animals occupying the same house and the accompanying vectors
house-spraying	Application of liquid insecticide formulation to specified (mostly interior) surfaces of buildings
human landing catch	A method for collecting vectors as they land on individuals *Note: The purpose is to monitor exposure of the human population to vector populations. It is used for estimating the "human biting rate", a basic factor for calculating the basic reproduction number and the vectorial capacity in epidemiological studies.*
hyperparasitaemia	A high density of parasites in the blood, which increases the risk that a patient's condition will deteriorate and become severe malaria *Note: See the current WHO definition (*Guidelines for the treatment of malaria. Third edition*)*
hypnozoite	Persistent liver stage of *P. vivax* and *P. ovale* malaria that remains dormant in host hepatocytes for variable periods, from 3 weeks to 1 year (exceptionally even longer), before activation and development into a pre-erythrocytic schizont, which then causes a blood-stage infection (relapse)
importation rate	Rate of influx of parasites via infected individuals or infected *Anopheles* spp. mosquitoes *Note "Infected individuals" includes residents infected while visiting endemic areas as well as infected immigrants. This term replaces the term vulnerability.*

importation risk	Probability of influx of infected individuals and/or infective anopheline mosquitoes *Note: Also referred to as "vulnerability"*
incidence, malaria	Number of newly diagnosed malaria cases during a defined period in a specified population
incubation period	Period between inoculation of malaria parasites and onset of clinical symptoms *Note: The shortest incubation period in mosquito-borne infections ranges from 7 days for* P. falciparum *to 23 days for* P. malariae *malaria. The long incubation for* P. vivax *and* P. ovale *malaria (from 3 weeks to 1 year and exceptionally many years) is due to activation of hypnozoites. The incubation period may be shorter in blood-induced infections than in sporozoite-induced infections, depending on the size of the inoculum.*
index, host preference	Proportion of blood-fed female *Anopheles* mosquitoes that fed on the host species and/or individual of interest *Note: Blood-fed female* Anopheles *mosquitoes are sampled at representative resting sites, and the blood meal of each host species or individual is identified. The methods include "precipitin testing" and molecular assays.*
index, human blood	Proportion of mosquito blood meals from humans
index, parasite-density	Mean parasite density on slides examined and found positive for a sample of the population; calculated as the geometric mean of individual parasite density counts
indoor residual spraying	Operational procedure and strategy for malaria vector control involving spraying interior surfaces of dwellings with a residual insecticide to kill or repel endophilic mosquitoes
indoors	Inside any shelter likely to be used by humans or animals, where mosquitoes may feed or rest *Note: Where indoor-resting mosquitoes can be targeted for indoor residual spraying*
infection, chronic	Long-term presence of parasitaemia that is not causing acute or obvious illness but could potentially be transmitted
infection, mixed	Malaria infection with more than one species of *Plasmodium*
infection, reservoir of	Any person or animal in which plasmodia live and multiply, such that they can be transmitted to a susceptible host
infection, submicroscopic	Low-density blood-stage malaria infections that are not detected by conventional microscopy
infectious	Capable of transmitting infection, a term commonly applied to human hosts
infective	Capable of producing infection, a term commonly applied to parasites (e.g. gametocytes, sporozoites) or to the vector (mosquito)
infectivity	Ability of a given Plasmodium strain to establish infection in susceptible humans and develop in competent *Anopheles* mosquitoes

insecticide	Chemical product (natural or synthetic) that kills insects. Ovicides kill eggs; larvicides (larvacides) kill larvae; pupacides kill pupae; adulticides kill adult mosquitoes. Residual insecticides remain active for an extended period *Note: Insecticides used for malaria vector control are approved by the WHO Pesticide Evaluation Scheme (WHOPES, http://www.who.int/whopes/).*
insecticide, cross-resistance	Resistance to one insecticide by a mechanism that also confers resistance to another insecticide, even when the insect population has not been selected by exposure to the latter
insecticide discriminating dose, or diagnostic dose for resistance	Amount of an insecticide (usually expressed as the concentration per standard period of exposure), which, in a sample of mosquitoes containing resistant individuals, distinguishes between susceptible and resistant phenotypes and determines their respective proportions *Note: When the genetic factor for resistance is either dominant or recessive, only one discriminating dose operates. When it is semi-dominant, two such doses may operate: a lower discriminating dose that kills susceptible mosquitoes only and an upper diagnostic dose that kills both susceptible mosquitoes and heterozygous (but not homozygous) resistant mosquitoes.*
insecticide, dose	Amount of active ingredient of insecticide applied per unit area of treatment (mg/m^2) for indoor residual spraying and treated mosquito nets, or per unit of space (mg/m^3) for space spraying and per unit area of application (g/ha or mg/m^2) or per volume of water (mg/L) for larvicides
insecticide, mixture	Insecticide product consisting of two or more active ingredients mixed as one formulation so that, when applied, the mosquito will contact both simultaneously
insecticide mosaic	Strategy for mitigating resistance, whereby insecticides with different modes of action are applied in different parts of an area under coverage (usually in a grid pattern), so that parts of the mosquito populations are exposed to one insecticide and others to another *Note: This is ideally combined with insecticide rotation, whereby the treatments of the mosaic are switched between areas periodically.*
insecticide resistance	Property of mosquitoes to survive exposure to a standard dose of insecticide; may be the result of physiological or behavioural adaptation *Note: The emergence of insecticide resistance in a vector population is an evolutionary phenomenon due to either behavioural avoidance (e.g. exophily instead of endophily) or physiological factors whereby the insecticide is metabolized, not potentiated, or absorbed less than by susceptible mosquitoes.*
insecticide rotation	Strategy involving sequential applications of insecticides with different modes of action to delay or mitigate resistance
insecticide tolerance	Less-than-average susceptibility to insecticide but not inherited as resistance
insecticide, contact	Insecticide that exerts a toxic action on mosquitoes when they rest on a treated surface; the insecticide is absorbed via the tarsi (feet).
insecticide, fumigant	Insecticide that acts by releasing vapour from a volatile substance

insecticide, residual	Insecticide that, when suitably applied onto a surface, maintains its insecticidal activity for a considerable time by either contact or fumigant action
integrated vector management	Rational decision-making for optimal use of resources for vector control *Note: The aim is to improve the efficacy, cost-effectiveness, ecological soundness and sustainability of vector control activities against vector-borne diseases.*
intermittent preventive treatment in infants	A full therapeutic course of sulfadoxine-pyrimethamine delivered to infants in co-administration with DTP2/Penta2, DTP3/Penta3 and measles immunization, regardless of whether the infant is infected with malaria
intermittent preventive treatment in pregnancy	A full therapeutic course of antimalarial medicine given to pregnant women at routine prenatal visits, regardless of whether the woman is infected with malaria
invasive species	A non-native species that establishes in a new ecosystem, and causes, or has the potential to cause, harm to the environment, economy, or human health. *Note: In malaria, it refers to* Anopheles *species.*
larval source management	Management of aquatic habitats (water bodies) that are potential habitats for mosquito larvae, in order to prevent completion of development of the immature stages *Note: The four types of larval source management are: habitat modification, which is a permanent alteration of the environment, e.g. land reclamation; habitat manipulation, which is a recurrent activity, e.g. flushing of streams; larviciding, which is regular application of biological or chemical insecticides to water bodies; and biological control, which consists of the introduction of natural predators into water bodies.*
larvicide	Substance used to kill mosquito larvae *Note: Larvicides are applied in the form of oils (to asphyxiate larvae and pupae), emulsions or small pellets or granules of inert carrier impregnated with insecticide, which is released gradually when they are placed in water.*
latent period	For *P. vivax* and *P. ovale* infections, the period between the primary infection and subsequent relapses. This stage is asymptomatic; parasites are absent from the bloodstream but present in hepatocytes.
long-lasting insecticidal net	A factory-treated mosquito net made of material into which insecticide is incorporated or bound around the fibres. The net must retain its effective biological activity for at least 20 WHO standard washes under laboratory conditions and 3 years of recommended use under field conditions.
malaria case	(See Case, malaria)
malaria, cerebral	(See Cerebral malaria)
malaria control	Reduction of disease incidence, prevalence, morbidity or mortality to a locally acceptable level as a result of deliberate efforts. Continued interventions are required to sustain control.

malaria elimination	Interruption of local transmission (reduction to zero incidence of indigenous cases) of a specified malaria parasite in a defined geographical area as a result of deliberate activities. Continued measures to prevent re-establishment of transmission are required. *Note: The certification of malaria elimination in a country will require that local transmission is interrupted for all human malaria parasites.*
malaria eradication	Permanent reduction to zero of the worldwide incidence of infection caused by human malaria parasites as a result of deliberate activities. Interventions are no longer required once eradication has been achieved.
malaria infection	Presence of *Plasmodium* parasites in blood or tissues, confirmed by diagnostic testing *Note: Diagnostic testing could consist of microscopy, rapid diagnostic testing or nucleic acid-based amplification (e.g. polymerase chain reaction assays to detect parasite DNA or RNA).*
malaria mortality rate	Number of deaths from malaria per unit of population during a defined period
malaria pigment (haemozoin)	A brown-to-black granular material formed by malaria parasites as a by-product of haemoglobin digestion. Pigment is evident in mature trophozoites and schizonts. It may also be phagocytosed by monocytes, macrophages and polymorphonuclear neutrophils.
malaria prevalence (parasite prevalence)	Proportion of a specified population with malaria infection at one time
malaria receptivity	Degree to which an ecosystem in a given area at a given time allows for the transmission of Plasmodium spp. from a human through a vector mosquito to another human. *Note: This concept reflects vectorial capacity, susceptibility of the human population to malaria infection, and the strength of the health system, including malaria interventions. Receptivity depends on vector susceptibility to particular species of Plasmodium, and is influenced by ecological and climatic factors.*
malaria reintroduction	Malaria reintroduction is the occurrence of introduced cases (cases of the first-generation local transmission that are epidemiologically linked to a confirmed imported case) in a country or area where the disease had previously been eliminated *Note: Malaria reintroduction is different from re-establishment of malaria transmission (see definition).*
malaria risk stratification	Classification of geographical areas or localities according to factors that determine receptivity and vulnerability to malaria transmission
malaria stratification	Classification of geographical areas or localities according to epidemiological, ecological, social and economic determinants for the purpose of guiding malaria interventions
malaria, cross-border	Malaria transmission associated with the movement of individuals or mosquitoes across borders
malaria-free	Describes an area in which there is no continuing local mosquito-borne malaria transmission and the risk for acquiring malaria is limited to infection from introduced cases

malariogenic potential	Potential level of transmission in a given area arising from the combination of malaria receptivity, importation rate of malaria parasites and infectivity. *Note: The concept of malariogenic potential is most relevant for elimination and prevention of re-establishment when indigenous transmission is mostly or entirely eliminated.*
malariometric survey	Survey conducted in a representative sample of selected age groups to estimate the prevalence of malaria and coverage of interventions *Note: Current standards for such surveys are malaria indicator surveys and related demographic and health surveys or multiple indicator cluster surveys.*
malarious area	Area in which transmission of malaria is occurring or has occurred during the preceding 3 years
mass drug administration	Administration of antimalarial treatment to all age groups of a defined population or every person living in a defined geographical area (except those for whom the medicine is contraindicated) at approximately the same time and often at repeated intervals
mass screening	Population-wide assessment of risk factors for malaria infection to identify subgroups for further intervention, such as diagnostic testing, treatment or preventive services
mass screening, testing and treatment	Screening of an entire population for risk factors, testing individuals at risk and treating those with a positive test result
mass testing and focal drug administration	Testing a population and treating groups of individuals or entire households in which one or more infections is detected
mass testing and treatment	Testing an entire population and treating individuals with a positive test result
medicine safety	Characteristics of a medicine that reflects its potential to cause harm, including the important identified risks of a drug and important potential risks *Note: The medicine safety specification should also address the populations potentially at-risk (where the product is likely to be used), and outstanding safety questions which require further investigation to refine the benefit-risk profile during the post-approval period (Adapted from ICH E2E definition).*
merozoite	Extracellular stage of a parasite released into host plasma when a hepatic or erythrocytic schizont ruptures; the merozoites can then invade red blood cells.
monotherapy	Antimalarial treatment with a single active compound or a synergistic combination of two compounds with related mechanisms of action
national focus register	Centralized database of all foci of malaria infection in a country, which includes relevant data on physical geography, parasites, hosts and vectors for each focus
national malaria case register	Centralized database with individual records of all malaria cases registered in a country

net, insecticide-treated	Mosquito net that repels, disables or kills mosquitoes that come into contact with the insecticide on the netting material. The two categories of insecticide-treated net are: • conventionally treated net: a mosquito net that has been treated by dipping it into a WHO-recommended insecticide. To ensure its continued insecticidal effect, the net should be re-treated periodically. • long-lasting insecticidal net: a factory-treated mosquito net made of netting material with insecticide incorporated within or bound around the fibres. The net must retain its effective biological activity for at least 20 WHO standard washes under laboratory conditions and 3 years of recommended use under field conditions. *Note: Untreated mosquito nets can also provide substantial protection against mosquito bites, but they have less effect against vectorial capacity and transmission rates. See also Long-lasting insecticidal net.*
oocyst	The stage of malaria parasite that develops from the ookinete; the oocyst grows on the outer wall of the midgut of the female mosquito.
oocyst rate	Percentage of female *Anopheles* mosquitoes with oocysts on the midgut
ookinete	Motile stage of malaria parasite after fertilization of macrogamete and preceding oocyst formation
parasitaemia	Presence of parasites in the blood *Note: If this condition is not accompanied by symptoms of malaria, it is known as asymptomatic parasitaemia*
parasitaemia, asymptomatic	The presence of asexual parasites in the blood without symptoms of illness
parasite clearance time	Time between first drug administration and the first examination in which no parasites are present in the blood by microscopy *Note: The time depends on the sensitivity of the method used to detect the parasite.*
parasite density	Number of asexual parasites per unit volume of blood or per number of red blood cells *Note: Any parasite density can lead to clinical illness; however, the likelihood of clinical illness generally increases with increasing parasite density.*
parasite density, low	Presence of *Plasmodium* parasites in the blood at parasite density below 100 parasites/µl *Note: The term should be accompanied by a description of the method of quantification. The terms "asymptomatic, submicroscopic and low density" are different and should not be used inter-changeably.*
patent period	Period during which malaria parasitaemia is detectable
Plasmodium	Genus of protozoan blood parasites of vertebrates that includes the causal agents of malaria. *P. falciparum*, *P. malariae*, *P. ovale* and *P. vivax* cause malaria in humans. Human infection with the monkey malaria parasite *P. knowlesi* and very occasionally with other simian malaria species may occur in tropical forest areas.

population at risk	Population living in a geographical area where locally acquired malaria cases have occurred in the past 3 years
population, target	An implementation unit targeted for activities or services (e.g. prevention, treatment)
pre-erythrocytic development	Development of the malaria parasite from the time it first enters the host and invades liver cells until the hepatic schizont ruptures *Note: After sporozoites are inoculated into a human by a female anopheline mosquito, they invade hepatocytes in the host liver and multiply there for a period ranging from 5.5 (*P. falciparum*) to 25 days (*P. malariae*), forming exoerythrocytic schizonts. These then rupture, liberating merozoites into the bloodstream, where they subsequently invade red blood cells. In vivax and ovale infections, some sporozoites remain dormant in the liver in the form of hypnozoites for periods of 3 weeks to 12 months and exceptionally several years.*
pre-patent period	Period between inoculation of parasites and the first appearance of parasitaemia
prequalification	Process to ensure that health products are safe, appropriate and meet stringent quality standards for international procurement *Note: Health products are prequalified by an assessment of product dossiers, inspection of manufacturing and testing sites, quality control testing in the case of vaccines and medicines, validation of the performance of diagnostic tests and verification that the products are suitable for use in the destination countries.*
preventive chemotherapy	Use of medicines either alone or in combination to prevent malaria infections and their consequences *Note: Preventive chemotherapy includes chemoprophylaxis, intermittent preventive treatment of infants and pregnant women, seasonal malaria chemoprevention and mass drug administration.*
prophylaxis	Any method of protection from or prevention of disease; when applied to chemotherapy, it is commonly termed "chemoprophylaxis".
prophylaxis, causal	Complete prevention of erythrocytic infection by destroying the pre-erythrocytic forms of the parasite
rapid diagnostic test	Immunochromatographic lateral flow device for rapid detection of malaria parasite antigens
rapid diagnostic test, combination	Malaria rapid diagnostic test that can detect a number of different malaria species
rapid diagnostic test positivity rate	Proportion of positive results among all rapid diagnostic tests performed
reactive focal screening, testing, treating or drug administration	Screening, testing, treating or administering drugs to a subset of a population in a given area in response to the detection of an infected person
receptivity	Receptivity of an ecosystem to transmission of malaria *Note: A receptive ecosystem should have e.g. the presence of competent vectors, a suitable climate and a susceptible population.*

recrudescence	Recurrence of asexual parasitaemia of the same genotype(s) that caused the original illness, due to incomplete clearance of asexual parasites after antimalarial treatment. *Note: Recrudescence is different from reinfection with a parasite of the same or different genotype(s) and relapse in* P. vivax *and* P. ovale *infections.*
recurrence	Reappearance of asexual parasitaemia after treatment, due to recrudescence, relapse (in *P. vivax* and *P. ovale* infections only) or a new infection
reinfection	A new infection that follows a primary infection; can be distinguished from recrudescence by the parasite genotype, which is often (but not always) different from that which caused the initial infection
reintroduction risk	The risk that endemic malaria will be re-established in a specific area, after its elimination *Note: The risk is typically determined by factors including climate, altitude, vector populations, human susceptibility, socio-economic status, urban or rural and coverage of interventions.*
relapse	Recurrence of asexual parasitaemia in *P. vivax* or *P. ovale* infections arising from hypnozoites *Note: Relapse occurs when the blood-stage infection has been eliminated but hypnozoites persist in the liver and mature to form hepatic schizonts. After an interval, generally from 3 weeks to 1 year, the hepatic schizonts rupture and liberate merozoites into the bloodstream.*
repellent	Any substance that causes avoidance in mosquitoes, especially substances that deter them from settling on the skin of the host (topical repellent) or entering an area or room (area repellent, spatial repellent, excito-repellent)
resistance	(See Drug resistance, Insecticide resistance)
ring form (ring stage, ring-stage trophozoite)	Young, usually ring-shaped malaria trophozoites, before pigment is evident by microscopy
schizont	Stage of the malaria parasite in host liver cells (hepatic schizont) or red blood cells (erythrocytic schizont) that is undergoing nuclear division by schizogony and, consequently, has more than one nucleus
screening	Identification of groups at risk that may require further intervention, such as diagnostic testing, treatment or preventive services
selection pressure	The force of an external agent that confers preferential survival; examples are the pressure of antimalarial medicines on malaria parasites and of insecticides on anopheline mosquitoes *Note: The term is applicable to human populations as well. As a result of selection pressure by malaria, certain genetic disorders (e.g. sickle-cell anaemia and glucose 6-phosphate dehydrogenase deficiency) that reduce the risk of severe malaria are more frequent in malaria-endemic areas.*
sensitivity (of a test)	Measured as the proportion of people with malaria infection (true positives) who have a positive result
serological assay	Procedure used to measure antimalarial antibodies in serum
severe anaemia	Haemoglobin concentration of < 5 g/100 mL (haematocrit < 15%)

severe falciparum malaria	Acute falciparum malaria with signs of severe illness and/or evidence of vital organ dysfunction *Note: See current WHO definition (*Guidelines for the treatment of malaria. Third edition*)*
single-dose regimen	Administration of a medicine as a single dose to achieve a therapeutic objective
slide positivity rate	Proportion of blood smears found to be positive for *Plasmodium* among all blood smears examined
specificity (of a test)	Measured as the proportion of people without malaria infection (true negatives) who have a negative result
sporozoite	Motile stage of the malaria parasite that is inoculated by a feeding female anopheline mosquito and may cause infection
sporozoite rate	Percentage of female *Anopheles* mosquitoes with sporozoites in the salivary glands
spray round	Spraying of all sprayable structures in an area designated for coverage in an indoor residual spraying programme during a discrete period *Note: Depending on the residual activity of the insecticide and also on the dynamics of transmission, one or more spray rounds a year may be required in the same area.*
sprayable	In the context of a malaria vector control programme, a unit (dwelling, house, room, shelter, structure, surface) suitable for spraying or required to be sprayed *Note: In house-spraying operations, usually implemented by indoor residual spraying*
spraying cycle	Repetition of spraying operations at regular intervals, often designated in terms of the interval between repetitions, e.g. a 6-month spraying cycle when spraying is repeated after a 6-month interval *Note: Not to be confused with "spray round"*
spraying frequency	Number of regular applications of insecticide per house per year, usually by indoor residual spraying
spraying interval	Time between successive applications of insecticide
spraying, focal	Spray coverage by indoor residual spraying and/or space spraying of houses or habitats in a limited geographical area
spraying, residual	Spraying the interior walls and ceilings of dwellings with a residual insecticide to kill or repel endophilic mosquito vectors of malaria
surveillance	Continuous, systematic collection, analysis and interpretation of disease-specific data and use in planning, implementing and evaluating public health practice *Note: Surveillance can be done at different levels of the health care system (e.g. health facilities, the community), with different detection systems (e.g. case-based: active or passive) and sampling strategies (e.g. sentinel sites, surveys).*

testing, malaria	Use of a malaria diagnostic test to determine whether an individual has malaria infection
tolerance	A response in a human or mosquito host to a given quantum of infection, toxicant or drug that is less than expected
transmission intensity	The frequency with which people living in an area are bitten by anopheline mosquitoes carrying human malaria sporozoites *Note: Transmission intensity is often expressed as the annual entomological inoculation rate, which is the average number of inoculations with malaria parasites estimated to be received by one person in a given period. Because of the difficulty of measuring entomological inoculation rate, parasite prevalence in young children is often used as a proxy for transmission intensity.*
transmission season	Period of the year during which most mosquito-borne transmission of malaria infection occurs
transmission, re-establishment of	Renewed presence of a measurable incidence of locally acquired malaria infection due to repeated cycles of mosquito-borne infections in an area in which transmission had been interrupted *Note: A minimum indication of possible re-establishment of transmission would be the occurrence of three or more indigenous malaria cases of the same species per year in the same focus, for 3 consecutive years.*
transmission, interruption of	Cessation of mosquito-borne transmission of malaria in a geographical area as a result of the application of antimalarial measures
transmission, perennial	Transmission that occurs throughout the year with no great variation in intensity
transmission, residual	Persistence of malaria transmission following the implementation in time and space of a widely effective malaria programme *Note: The sources of and risks for "residual transmission" may vary by location, time and the existing components of the current "effective malaria programme".*
transmission, seasonal	Transmission that occurs only during some months of the year and is markedly reduced during other months
transmission, stable	Epidemiological type of malaria transmission characterized by a steady prevalence pattern, with little variation from one year to another except as the result of rapid scaling up of malaria interventions or exceptional environmental changes that affect transmission *Note: In areas with stable transmission, the affected population often has high levels of immunity, and malaria vectors usually have high longevity and human-biting rates.*
transmission, unstable	Epidemiological type of malaria transmission characterized by large variation in incidence patterns from one year to another *Note: In areas with unstable transmission, epidemics are common and the population usually has little immunity.*

trap, mosquito	Device designed for capturing mosquitoes with or without attractant components (light, CO_2, living baits, suction) *Note: Mosquito traps are used to sample the density of mosquitoes or to study the effects of attractants, repellents or control interventions; mosquito trapping may also be intended for their control. This includes: i) individual devices used to attract mosquitoes with appropriate lures (light, CO_2, living baits, etc.); ii) window traps placed on points of entry or exit of mosquitoes into houses, without any lure and being as unobtrusive as possible, meant to study factors such as indoor feeding, delayed mortality or repellency effect of the insecticide used for IRS; iii) killing traps to attract mosquitoes by powerful attractants, chemical or physical, to their death.*
treatment failure	Inability to clear malarial parasitaemia or prevent recrudescence after administration of an antimalarial medicine, regardless of whether clinical symptoms are resolved
treatment, anti-relapse	Antimalarial treatment designed to kill hypnozoites and thereby prevent relapses or late primary infections with *P. vivax* or *P. ovale*
treatment, directly observed	Treatment administered under the direct observation of a health care worker
treatment, first-line	Treatment recommended in national treatment guidelines as the medicine of choice for treating malaria
treatment, second-line	Treatment used after failure of first-line treatment or in patients who are allergic to or unable to tolerate the first-line treatment
treatment, presumptive	Administration of an antimalarial drug or drugs to people with suspected malaria without testing or before the results of blood examinations are available *Note: This practice may lead to wrong treatment of the underlying disease and is only acceptable in exceptional circumstances. It should be reported to guide appropriate action and improvement of the situation.*
treatment, preventive	Intermittent administration of a full therapeutic course of an antimalarial either alone or in combination to prevent malarial illness by maintaining therapeutic drug levels in the blood throughout the period of greatest risk. *Note: WHO recommended preventive treatment includes intermittent preventive treatment of infants and pregnant women and seasonal malaria chemoprevention.*
treatment, radical	Treatment to achieve complete cure. This applies only to vivax and ovale infections and consists of the use of medicines that destroy both blood and liver stages of the parasite.
trophozoite	The stage of development of malaria parasites growing within host red blood cells from the ring stage to just before nuclear division. Trophozoites contain malaria pigment that is visible by microscopy.
uncomplicated malaria	Symptomatic malaria parasitaemia without signs of severity or evidence of vital organ dysfunction *Note: See current WHO definition (*Guidelines for the treatment of malaria. Third edition*). Malaria-associated disease can be defined more specifically by criteria for the degree of fever (e.g. temperature > 37.5 °C) and level of parasitaemia (e.g. > 5000 parasites/µL).*

vector	In malaria, adult females of any mosquito species in which *Plasmodium* undergoes its sexual cycle (whereby the mosquito is the definitive host of the parasite) to the infective sporozoite stage (completion of extrinsic development), ready for transmission when a vertebrate host is bitten *Note: Malaria vector species are usually implicated (incriminated) after field collection and dissection indicates that the salivary glands are infected with sporozoites; specific assays can be used to detect and identify circumsporozoite protein, especially where infection rates are low.*
vector competence	For malaria, the ability of the mosquito to support completion of malaria parasite development after zygote formation and oocyst formation, development and release of sporozoites that migrate to salivary glands, allowing transmission of viable sporozoites when the infective female mosquito feeds again *Note: Human malarias are transmitted exclusively by competent species of* Anopheles *mosquitoes; various plasmodia are transmitted by competent species of mosquitoes of the genera* Aedes, Anopheles *and* Culex *and other haematophagous Diptera.*
vector control	Measures of any kind against malaria-transmitting mosquitoes, intended to limit their ability to transmit the disease *Note: Ideally, malaria vector control results in reduction of malaria transmission rates, by reducing the vectorial capacity, to a point at which transmission is interrupted.*
vector susceptibility	The degree to which a mosquito population is susceptible (i.e. not resistant) to insecticides *Note: Not to be confused with "vector competence"*
vector, principal	The species of *Anopheles* mainly responsible for transmitting malaria in any particular circumstance *Note: Principal vectors may overlap seasonally or alternate in importance.*
vector, secondary or subsidiary	Species of *Anopheles* thought to play a lesser role in transmission than the principal vector; capable of maintaining malaria transmission at a reduced level
vectorial capacity	Number of new infections that the population of a given vector would induce per case per day at a given place and time, assuming that the human population is and remains fully susceptible to malaria
vigilance	A function of the public health services for preventing reintroduction of malaria. Vigilance consists of close monitoring for any occurrence of malaria in receptive areas and application of the necessary measures to prevent re-establishment of transmission.

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Archived terms

biting-capture, biting collection, human bait collection	Sampling of populations of mosquitoes and other haematophagous insects by capture when they bite on human bait or other hosts *Note: Discouraged for ethical reasons, to prevent human exposure to risks of transmission of vector-borne diseases; human landing collection is the recommended alternative.*
breeding site, breeding place	Obsolete term for larval habitat: site at which developmental stages of mosquitoes (eggs, larvae, pupae) are found, including sites that appear to be ecologically suitable for particular species
cure, clinical	Relief of symptoms of a malaria attack (e.g. by chemotherapeutic action against asexual erythrocytic parasites), without complete elimination of the infection
cure, suppressive	Complete elimination of the parasite from the body by means of continuous suppressive treatment
discharge register	List of patients who leave inpatient hospital care. Discharge registers should contain the date of admission, patient's name, residence, age, sex, diagnosis, length of stay and reason for leaving (discharged, died, transferred, absconded). This information should be abstracted from the patient file by appropriately trained staff.
drug failure	Absence or insufficiency of drug action after administration of a normally effective dose. It is important to discriminate between such causes of drug failure as deficient absorption, unusual rate of degradation or excretion of the drug and resistance of the parasite.
infection interval	Period elapsing from the time an individual is infected until he or she becomes infectious to others. In malaria, the infection interval is the period between the inoculation of a human being with sporozoites and the appearance of gametocytes potentially infective to mosquitos. To be distinguished from incubation interval and incubation period.
malaria baseline	The malaria burden that would be present in a specific area if there were no control activities. Also termed "intrinsic malaria transmission level"
malaria, refractory	Term used by some authors to describe persistence or slow, gradual reduction in the prevalence of malaria despite total-coverage spraying
malaria, responsive	Term used by some authors to describe malaria that is rapidly reduced in prevalence by total-coverage spraying soon after the beginning of the attack phase
malaria, sporadic	Term applied to malaria when autochthonous cases are too few and scattered to have any appreciable effect on the community. Such cases are often due to relapses of a previous infection. For purposes of epidemiological classification by origin of infection, the term "relapsing " is preferred.

mass blood examination	Examination of the blood of all members of a unit of population, which may be repeated at certain intervals. Blood specimens are commonly obtained during house-to-house visits. Unlike other case-detection methods, mass blood examinations are used to detect all people harbouring malaria parasites, even those who have no clinical symptoms; they thus supplement routine methods in problem areas and are useful for demonstrating the proportion of asymptomatic carriers present in the community examined. Mass blood examination forms part of case-detection activities and must be distinguished from malariometric surveys, which are carried out on a sampling basis in selected groups.
mass primaquine preventive treatment	Administration of primaquine anti-relapse therapy to each individual in a defined population or geographical area during the low-transmission season to eliminate long-latency hypnozoites in infected people, with the aim of reducing *P. vivax* malaria transmission during the next transmission season. *Note: For safety reasons, recipients should be tested for glucose 6-phosphate dehydrogenase activity before the intervention.*
outbreak	A case or a greater number of cases of locally transmitted infection than would be expected at a particular time and place *Note: The correct term is "epidemic".*
outpatient register	List of patients seen in consultation at a health facility. A register may include the date of consultation, patient's age, place of residence and presenting health complaint, tests performed and diagnosis
phase, attack	In malaria eradication terminology, the phase during which antimalarial measures that can be used on a large scale for interrupting transmission are applied for total coverage of an operational area. This phase is sometimes called the period of total coverage spraying.
phase, consolidation	In malaria eradication terminology, the phase that follows the attack phase. It is characterized by active, intense, complete surveillance, with the objective of eliminating any remaining infections and proving the eradication of malaria. It ends when the criteria for eradication have been met.
phase, maintenance	In malaria eradication terminology, period that begins when the criteria for malaria eradication have been met in an operational area and will continue until worldwide eradication has been achieved. During this period, vigilance is exercised by the public health services to prevent the spread of malaria imported from across the borders of the area concerned.
phase, preparatory	In malaria eradication terminology, the time devoted to preparation for attack operations. It ends when epidemiological and geographical reconnaissance in the operational area is completed, central and peripheral stations and essential services are established, staff are recruited and trained and logistics and reporting systems are organized.
population, vulnerable	Groups of people who are particularly vulnerable to malaria infection in certain situations or contexts, such as mobile workers. Each country should define the populations that are particularly vulnerable in the epidemiological and social context.
population-based blood survey	Survey in which a blood smear is taken on one or more occasions from each individual in a given population (irrespective of history of fever) to assess the prevalence of malaria parasitaemia (both symptomatic and asymptomatic) in the population. Such surveys may also provide supportive evidence of the interruption of transmission.

potential vector	Species with vector competence and appreciable vectorial capacity
pre-eradication programme	Preliminary operation undertaken in a country in which the general administrative and health services are not yet able to undertake a malaria eradication programme
pre-eradication survey	Operation for the collection of accurate data on the malaria situation, preliminary to drafting a complete plan of operations for a malaria eradication programme. The undertaking of such a survey presupposes the availability of evidence that transmission can be interrupted by the methods commonly used in malaria eradication and the existence of basic operational facilities. The period of the pre-eradication survey ends when the plan of operations has been prepared.
prophylaxis, absolute	Absolute prevention of infection, implying destruction of inoculated sporozoites before they can fix themselves in the tissues
prophylaxis, clinical	Prevention of clinical symptoms by early destruction of erythrocytic parasites. It is considered to suppress malaria when it permits the continued existence of exoerythrocytic forms or of some erythrocytic forms that will permit subsequent multiplication of the parasite after discontinuation of the drug. All blood schizontocides are clinical prophylactic drugs or suppressants, as they destroy merozoites entering the bloodstream before they can establish schizogony. This results in prevention of erythrocytic infection, or at least in its reduction to a sub-patent level while the drug is being taken, but overt attacks may occur after it is discontinued.
rate, malaria morbidity	Number of recorded clinical cases of malaria per unit of population over a certain period. The malaria morbidity rate is too imprecise to be of value in malaria eradication.
rate, parasite	Percentage of people in a defined age group showing, on a given date, microscopically detectable parasites in peripheral blood. The parasite rate should always be defined in terms of the age group examined.
sub-perennial	Transmission occurs throughout the year with peaks of markedly greater intensity in some months.
surveillance, active	A surveillance system in which public health workers seek reports on a regular basis from participants in the surveillance system, rather than waiting passively for the reports to be submitted
surveillance, case-based	Each case is reported and investigated immediately and included in the weekly reporting system. *Note: Surveillance in which all cases included in the regular reporting system are investigated*
surveillance, community-based	Surveillance in which notification starts at community level, usually reported by a community worker. It can be active (looking for cases) or passive (reporting cases). Community-based surveillance may be particularly useful during an epidemic and when syndromic case definitions can be used.
surveillance, hospital-based	Surveillance in which notification starts with identification by a hospital of a patient with a particular disease or syndrome
surveillance, passive	Surveillance in which reports are awaited and no attempt is made to seek reports actively from the participants in the system.
surveillance, sentinel	Collection and use of data from a random or non-random sample of collecting sites as indicator data for the population as a whole, in order to identify cases of a disease early or to obtain indicative data about trends of a disease or health event that is not malaria specific

trap hut	Structure adapted for trapping mosquitoes attracted by bait (human or animal) placed inside it *Note: The purpose of trap huts is to collect a representative portion of incoming mosquitoes and/or to test the effectiveness of an insecticide. They are usually of simple design, often built of the same materials as local habitations, and are provided with trapping devices – usually one or more window traps – so that mosquitos are trapped as they enter or leave. See also "Experimental hut".*
treatment, suppressive	Treatment to prevent or eliminate clinical symptoms and/or parasitaemia by early destruction of erythrocytic parasites. It does not necessarily prevent or eliminate the infection, and malaria may become overt after drug withdrawal.
treatment, targeted	Administration of drugs to a group whose eligibility for treatment is defined by age, sex or social characteristics, irrespective of infection status (exclusion criteria may apply)
vector efficiency	Imprecise way of ranking vector species or populations as relatively more or less important in transmission *Note: More difficult to calculate than vectorial capacity*
vulnerability	The frequency of influx of infected individuals or groups and/or infective anopheline mosquitoes *Note: Also referred to as "importation risk". The term can also be applied to the introduction of drug resistance in a specific area.*

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