THE LANCET

Supplementary webappendix

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Web extra material for 'Ranking elimination feasibility among malaria endemic countries'

Contents

1: Deriving malaria elimination feasibility indicators

1.1 Deriving technical feasibility indicators

1.1.1 Estimating the relative intensity of endemic *P. falciparum* transmission

1.1.1.1 Datasets

The publication of (i) the revised global spatial limits of *P. falciparum* transmission[1] and (ii) a contemporary, model-based geostatistical description of *P. falciparum* malaria endemicity within these limits[2] by the Malaria Atlas Project (MAP), has resulted in a substantially improved evidence-base from which to derive estimates of baseline endemic transmission (R_0). The models used to translate this malaria endemicity map into a map of R_0 are described in the main manuscript. While this MAP-derived R_0 map is useful for quantifying the relative variations in transmission between countries, it does not take into account population distribution, and it is the transmission intensity where people live that is epidemiologically important. Therefore, the Global Rural Urban Mapping Project (GRUMP) *alpha* gridded population surface[3] was used to obtain a population weighted average for each country to provide a mean measure of the relative baseline R_0 between countries. This was preferred to a simple areal mean, since transmission levels in populated areas are more informative when assessing feasibility of elimination, whilst the incorporation of large unpopulated areas produces a skewed picture. These data are shown in Figure S1.1 and Table S1.1.

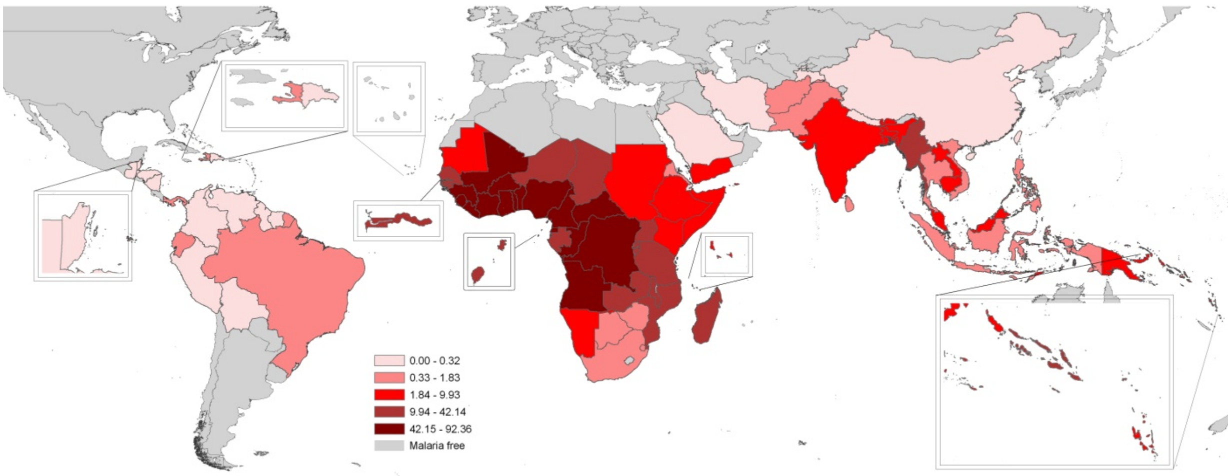

Figure S1.1. Population-weighted national estimates of MAP 2007 world malaria map derived R_0 for each *P. falciparum* endemic country in 2007.

Figure S1.1 (and Figure 2 in the main manuscript) identifies the level of additional control required on top of the contemporary patchwork of intervention coverage[4, 5] to achieve elimination. The measurement of technical feasibility, however, requires estimates of baseline transmission intensity (see main paper). For instance, contemporary R_C values for Saudi Arabia and coastal Kenya are similarly low, but this is likely to be primarily due to the intensive control efforts presently underway in Kilifi[6]. Differences between the two areas, principally related to biological factors, such as the vectorial capacity, mean that baseline endemic transmission intensity (R_0) for Kilifi is substantially larger than for Saudi Arabia. These differences are generally reflected in Figure S1.1, given that (i) the map is derived from both contemporary and older community prevalence surveys, (ii) recent intervention scale-ups will take time to show significant reductions in transmission, and (iii) intervention coverages for much of the world remain relatively low[4]. However, it could be argued that, for some areas, Figure S1.1 may not reflect baseline transmission intensity, and thus we test the use of an alternative transmission map here.

The only global map of pre-intervention malaria endemicity comes from a 1968 study by Lysenko[7] (Figure S1.2). Endemicity as used by Lysenko was defined by the parasite rate (the proportion of a population sample with parasite in their blood) in the 2-10 year age cohort (hypoendemic <0.1; mesoendemic 0.11-0.5; hyperendemic 0.51-0.75), except for the holoendemic class (>0.75), where the parasite rate refers to the one-year age group[8]. This map was a major synthesis of historical records, documents and maps of a variety of malariometric indices (records of disease and vector presence and absence, spleen rates, parasite rates, sporozoite rates and biting rates) used to record malaria endemicity until the late 1960s. These data were interpolated globally for malaria at the peak of its assumed historical distribution around 1900, using a combination of expert opinion, global elevation, temperature and rainfall isohyets[7, 9]. Development, urbanization, aggressive vector control, chemotherapy and deforestation, amongst others, over the past century will have altered the malaria risk levels shown substantially, making the map a poor reflection of absolute present day transmission intensity. However, our focus here is on the examination of contemporary *relative* malaria elimination feasibility between nations and thus it is likely to present a feasible alternative for assessing relative differences between baseline transmission levels.

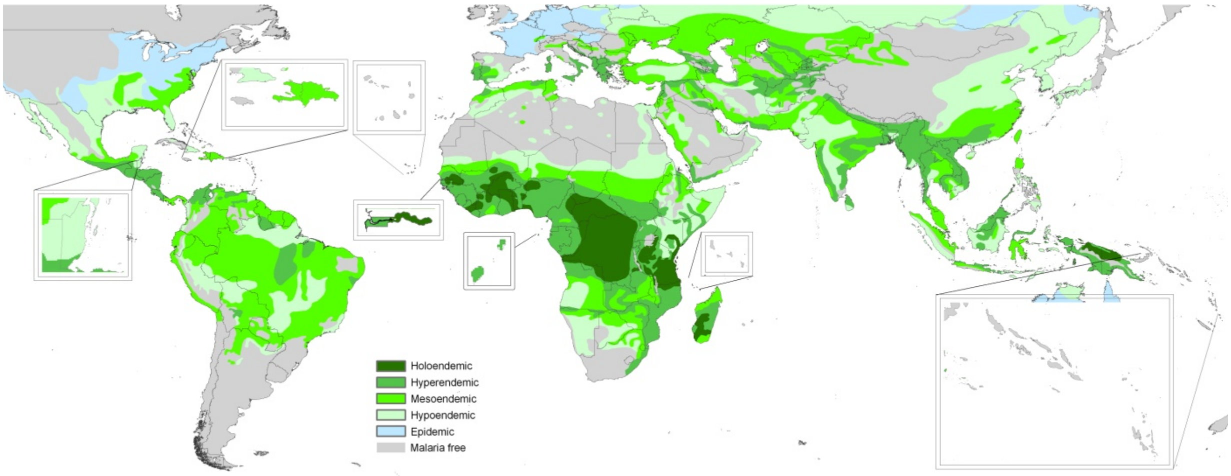

Figure S1.2. Pre-intervention *P. falciparum* endemicity (c. 1900) as defined by Lysenko [7]. Light gray: no risk; light blue: epidemic risk (note that this class refers to areas with very low prevailing risk and is restricted to the temperate regions - the term "epidemic risk" is used differently today); light green: hypoendemic risk (PR of less than 0.10); medium green: mesoendemic risk (PR ≥0.10-<0.50); dark green: hyperendemic risk (PR ≥0.50-<0.75); very dark green: holoendemic risk (PR ≥0.75). PR here relates to the 2-10 year age cohort, except for the holoendemic class, where it relates to the one-year age group.

The Lysenko map was scanned from the original publication and geo-referenced using ERDAS Imagine 8.5 (Leica Geosystems GIS & Mapping, Atlanta, USA). The map was then digitised on-screen with MapInfo Professional 7.0 (MapInfo Corp., New York. USA) and converted to a 1 x 1 km gridded version. The values were then reclassified to represent the midpoint of each parasite rate class, thus hypoendemic = 0.05, mesoendemic = 0.3, hyperendemic = 0.625 holoendemic = 0.875. Comoros, Solomon Islands and Vanuatu were not covered in the original Lysenko map, therefore transmission estimates were substituted in from the recently published 2007 world malaria map[2] for these nations. This adapted Lysenko map was then converted to a map of R_0 using the models outlined in the main manuscript, and population-weighted national estimates were produced as described above. These data are shown in Figure S1.3.

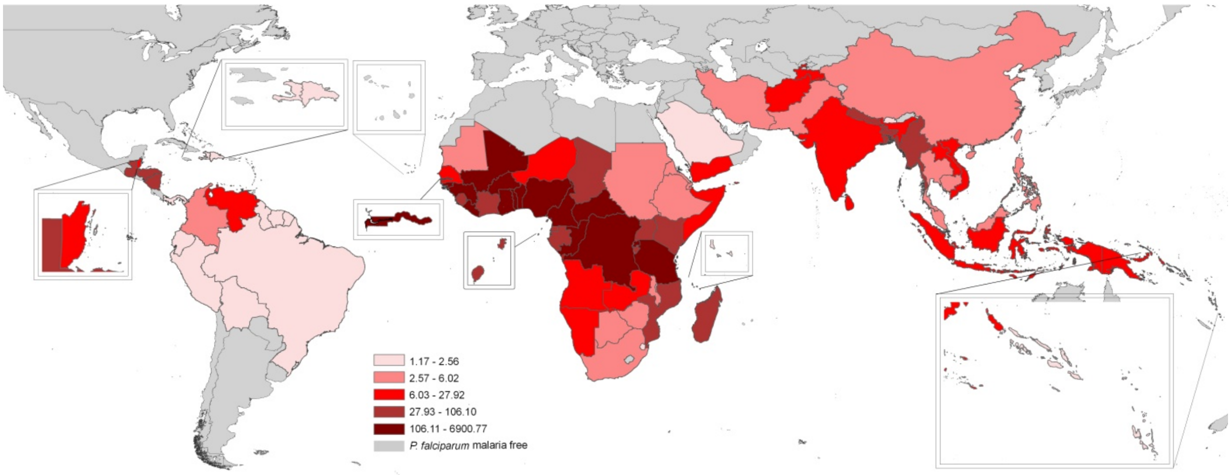

Figure S1.3. Population-weighted national estimates of Lysenko derived R_0 for each *P. falciparum* endemic country in 1900.

1.1.1.2 Testing the sensitivity of dataset choice

Figure S1.4 shows the relationship between baseline transmission rankings derived from the MAP 2007 map and the Lysenko map. The statistics and visual examination indicates that a significant relationship between the two exists, but some substantial differences are present, particularly at the lowest rankings. Therefore, the difference in overall results when the two alternative maps were used to derive baseline transmission rankings was examined.

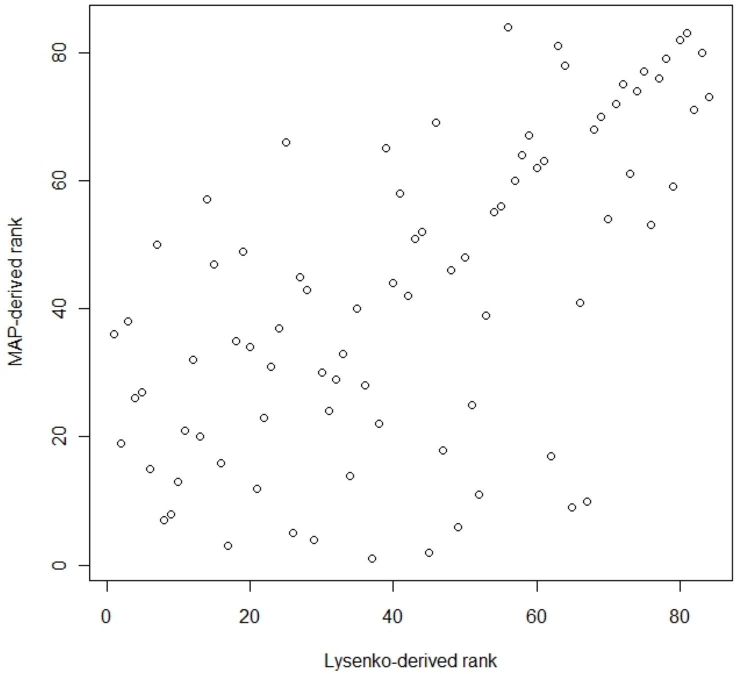

Figure S1.4. Scatterplot of *P. falciparum* malaria endemic country rankings for MAP-derived versus Lysenko-derived R_0 estimates (r^2 = 0.389, *p*<<0.01).

The overall feasibility analyses were re-run using (i) the MAP 2007 derived R_0 estimates, and (ii) the Lysenko derived R_0 estimates, keeping all other factors the same. The results of these comparisons are shown in Figure S1.5, and demonstrate zero or little change in average ranking for the majority of countries, with an average absolute rank change of just 2.02. This results principally from substantial differences in endemicity estimates for east Asia, particularly Afghanistan and Pakistan. These results demonstrate that, while neither map is a definitive source for derivation of baseline transmission estimates, and that the use of either could be argued for, the consequences of this choice result in minimal changes to overall conclusions.

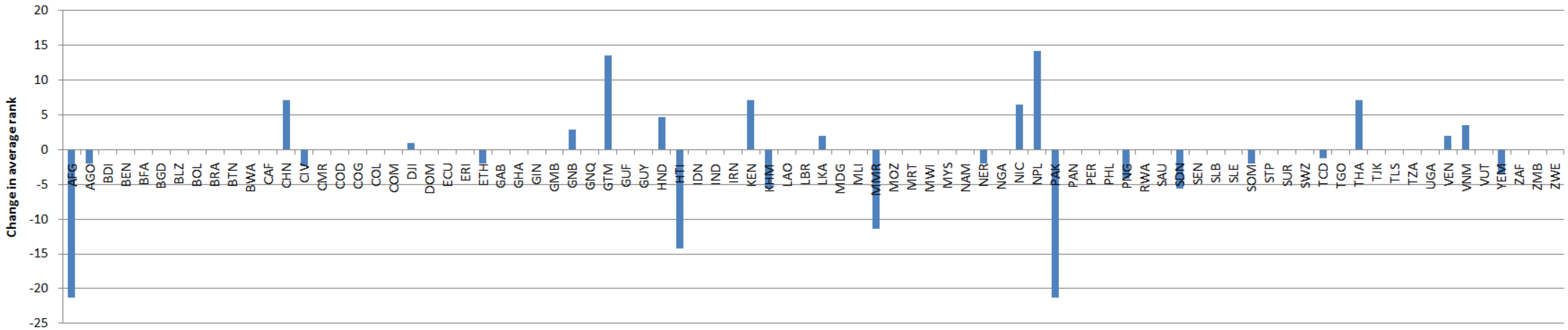

Figure S1.5. Change in average rank for each *P. falciparum* malaria endemic country when switching from using MAP 2007 to Lysenko in order to derive R_0 estimates.

1.1.2 Estimating relative imported *P. falciparum* malaria rates

Malaria is constantly being exported and imported around the world and, in areas of high R_0, malaria importation is generally a minor concern. As local transmission is reduced, however, the importance of imported malaria increases. Moreover, after R_0 has been pushed below a value of one and malaria has been eliminated from a region, importation becomes the primary concern. Importation risk can be defined as the probability of malaria reintroduction based on the flux of infected humans or infected *Anopheles* mosquitoes; the relevant quantities are the rate of infected and infectious hosts that are imported into a country each year.

In general, parasites can be imported in one of three ways: (i) the migration of an infected mosquito, (ii) infected humans visiting or migrating from an endemic area, (iii) residents visiting an endemic area and becoming infected, then returning. While mosquitoes can occasionally travel long distances though wind-blown or accidental aircraft or ship transport, typically they will only fly short distances[10]. Human carriage of parasites therefore represents the principal risk, and is to blame in many past instances where malaria has resurged[11-14]. It can also be shown to be the cause of sustained transmission in low endemic areas[15, 16]. Imported malaria cases carry parasites, including resistant strains, even if they are asymptomatic[17]. Quantifying human movements both temporally and spatially, and their resulting imported infection risks, represents an important task if elimination feasibility is to be assessed and if effective, evidence-based planning for elimination is to be undertaken[18].

Rigorous examination of the role of human movement across different scales will significantly improve understanding of malaria transmission at low levels, which will be critical in increasing the effectiveness of elimination programs. At the global scale, implementation of such approaches is hampered by a severe lack of data. Ideally, data on international population flows at the range of spatial and temporal scales relevant to malaria transmission[11, 16] are required to fully quantify importation risks. These include regular cross-border travel for work, social visits and seasonal migrations, but such data are non-existent for most of the world. Moreover, basic, inter-comparable data on population flows are lacking for a large number of countries (particularly malaria-endemic countries), and are both patchy and extremely variable for the remainder of countries, even in highly developed settings.

The recent construction of a bilateral database of international migration[19] provides valuable information on the relative strength of movements of people between nations. Wherever possible, these data were derived from the latest round of censuses, as these were considered most comparable at the global level. Where unavailable, population registers were drawn upon, and in the cases of missing data, a variety of techniques and tests were employed to create and validate a complete matrix of international bilateral migrant stocks[19]. Finally, all data prior to 2000 were scaled to the United Nations mid-year totals of migrant stocks for 2000 (United Nations 2004). For each country or territory, the completed dataset represented the number of foreign-born and foreign-nationality people in residence in 2000-2, and which country/territory they were born in or had come from[19]. These foreign-born and foreign-national population stock data may include long-term migrants and seasonal workers, and may, therefore, more readily accord to the actual movements of people than any other globally comparable measures[19, 20].

To obtain a surrogate measure of relative *P. falciparum* importation rates, the population-weighted *Pf*PR (*Pf*PRpw) for each country was calculated using the same approach, based on the GRUMP population surface, as in the previous section. The product of this *Pf*PRpw and each of the outgoing migration counts were calculated for each *P. falciparum* malaria endemic country (*Pf*MEC). Then, for each country the sum of the incoming *Pf*PRpw-scaled migrant counts was calculated. This produced an index that accounted for both the relative number of incoming migrants to a country, and the *P. falciparum* endemicity in the country from which they had arrived. The index is high when a country has high incoming population flows from high *P. falciparum* endemicity countries, and the index is low when either it has relatively low numbers coming in, or those arriving are from low endemicity countries. The imported *P. falciparum* malaria index scores for each endemic country are shown in Figure S1.6 and Table S1.1.

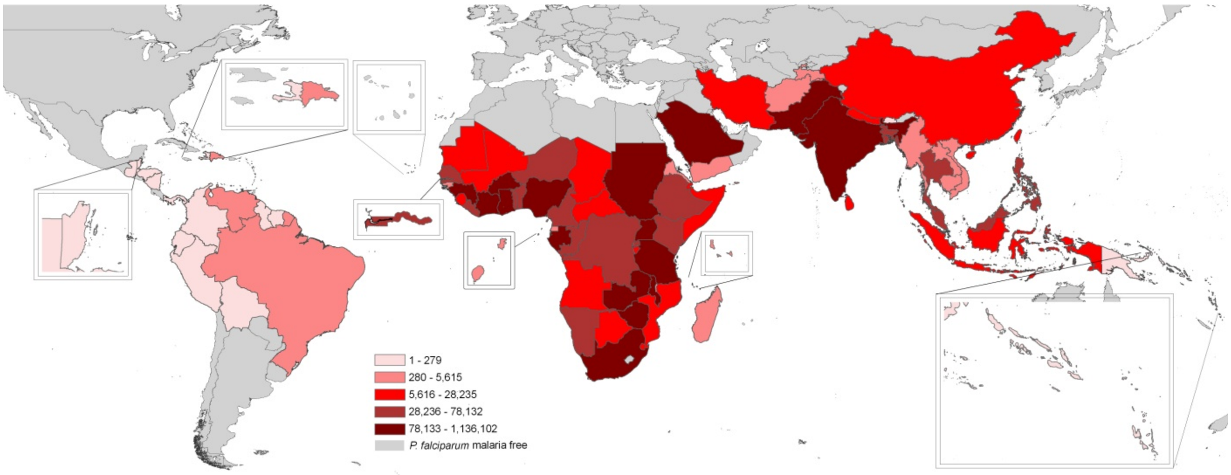

Figure S1.6. *P. falciparum* malaria importation index for each endemic country for 2007. Large values indicate high numbers of imported *P. falciparum* carriers and low numbers indicate relatively low numbers of incoming carriers.

1.2 Deriving operational feasibility indicators

1.2.1 Government stability, effectiveness and commitment

1.2.1.1 Datasets

The WHO noted that of the 108 countries that have been successful in eliminating malaria, an absence of conflict and effective organization were common factors[21]. For any malaria elimination campaign to be successful, an enabling environment is required where political stability and an absence of conflict are central. Moreover, strong and effective organization and infrastructure are required to achieve elimination. This includes the capacity to implement and run a near-perfect surveillance system and a strong health system, to provide effective information and education programs, to construct a legal framework adapted to the needs of an elimination program, and to facilitate excellent inter-agency, community and cross-border collaboration. Quantifying these aspects is a difficult task, since political stability can change rapidly, and the organizational and technical infrastructure set up to eliminate malaria will be constructed once any decision to eliminate has been made. However, indices measuring the perceptions of a range of organizations and individuals on both political stability and the effectiveness of governments in delivering services and policy can be obtained from the World Bank's 'Aggregate and Individual Governance Indicators'[22, 23].

The World Bank indicators cover 212 countries and territories and measure six dimensions of governance between 1996 and 2007: Voice and Accountability, Political Stability and Absence of Violence, Government Effectiveness, Regulatory Quality, Rule of Law, and Control of Corruption[22, 23]. The indicators are based on hundreds of specific and disaggregated individual variables measuring various dimensions of governance, taken from 35 data sources provided by 32 different organizations, and they are described in detail by Kaufmann *et al*[22]. In brief, answers to 365 questions on the perceptions of governance by firms, qualified individuals, commercial risk rating agencies, non-governmental organizations, and a number of multilateral aid agencies and other public sector organizations were compiled. The questions were assigned to one of the six dimensions of governance outlined above, with final indices calculated through weighted averages of the responses. The two dimensions which best capture the political stability and effectiveness of organization aspects that are so relevant to malaria elimination are the Political Stability and Absence of Violence index and the Government Effectiveness index.

The Political Stability and Absence of Violence index is defined as being a measure of the "perceptions of the likelihood that the government will be destabilized or overthrown by possibly unconstitutional and/or violent means, including domestic violence and terrorism"[22, 23]. Low scores for this variable mean that citizens cannot count upon the continuity of government policy or the ability to peacefully select and replace those in power. These data were extracted for every *P. falciparum* and *P. vivax* malaria endemic country for the most recent year of data available: 2008[23]. These do not therefore capture more recent changes, such as the decline in stability in Madagascar, post-election violence in Kenya or the end of conflict in northern Sri Lanka. While it represents a key component of assessing malaria elimination feasibility, political stability remains a difficult factor to predict. With annual iterations of the governance indicators, however, updates can easily be incorporated. The 2008 data are shown in supplemental Figure S1.7 and Table S1.1.

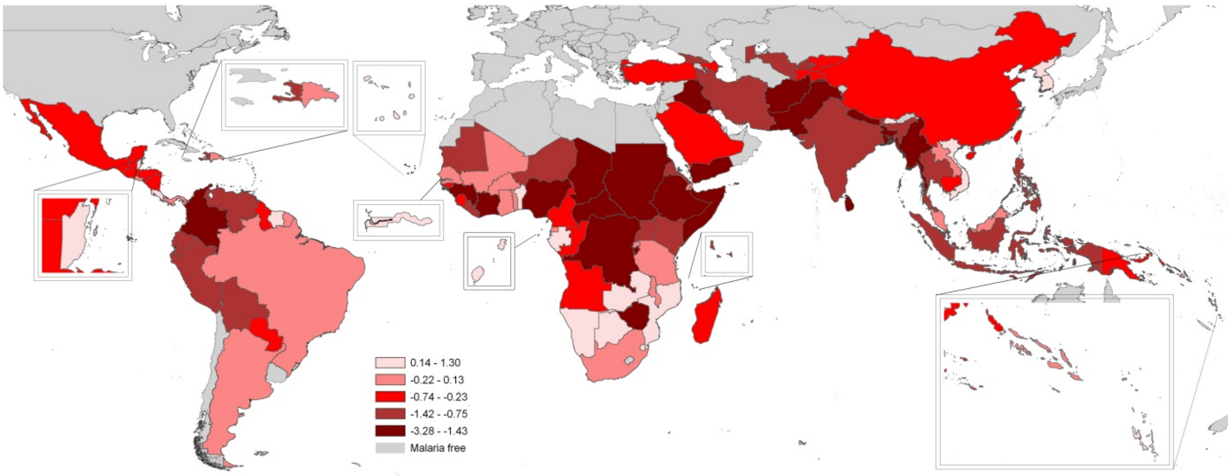

Figure S1.7. World Bank political stability and absence of violence index for each malaria endemic country in 2008. The most politically stable countries have high index scores, while those that are unstable or in conflict have low scores.

The Government Effectiveness index is defined as a measure of "the quality of public service provision, the quality of the bureaucracy, the competence of public servants, and the independence of the civil service from political pressures"[22, 23]. These data were again obtained for every *P. falciparum* and *P. vivax* MEC for the most recent year available: 2008[23], and are shown in supplemental Figure S1.8 and Table S1.1.

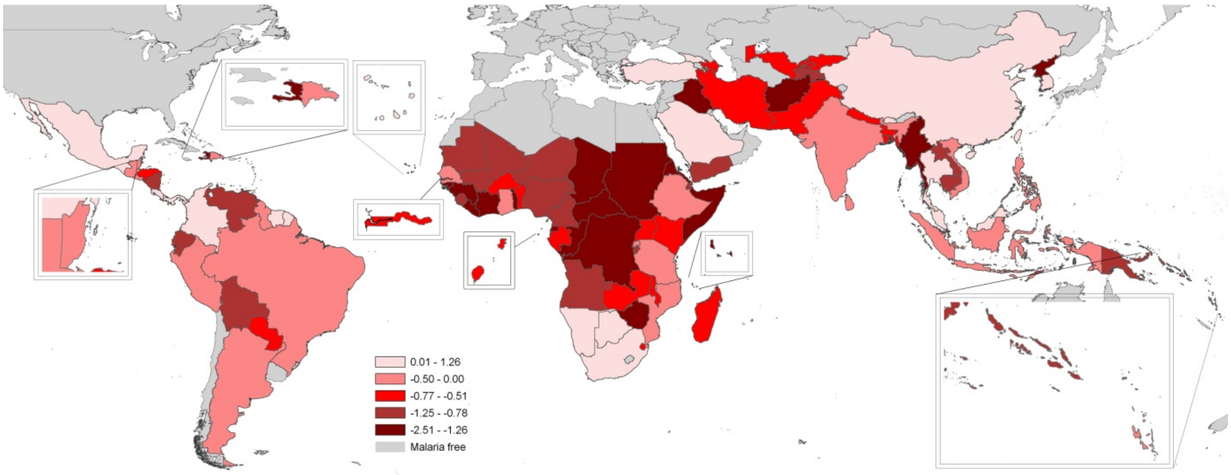

Figure S1.8. World Bank government effectiveness index for each malaria endemic country in 2008. High scores indicate effective governance, while low scores indicate ineffective governance.

The majority of countries will need to strengthen their health systems to achieve and sustain zero transmission, requiring strong political and financial commitment. Future health system performance and commitment to elimination are very difficult factors to measure, however, since governmental, political, and financial motivation for malaria elimination in the majority of countries is hard to gauge and harder to predict on the multiple-decade timeline which a malaria elimination plan implies[24, 25]. Nevertheless, existing data on public health spending by both the government and private health sector provides an indicator of how committed a nation is presently, both financially and politically, to the health of its citizens, and this would be likely to correlate with a commitment to malaria elimination. To ensure comparability of expenditure between countries, accounting for both population size and differing costs, data on *per capita* total US$ expenditure on health at average exchange rates for the most recent year available, 2006, were acquired. These data were obtained from the World Health Report 2009 of the WHO[26] and are shown in supplemental Figure S1.9 and Table S1.1.

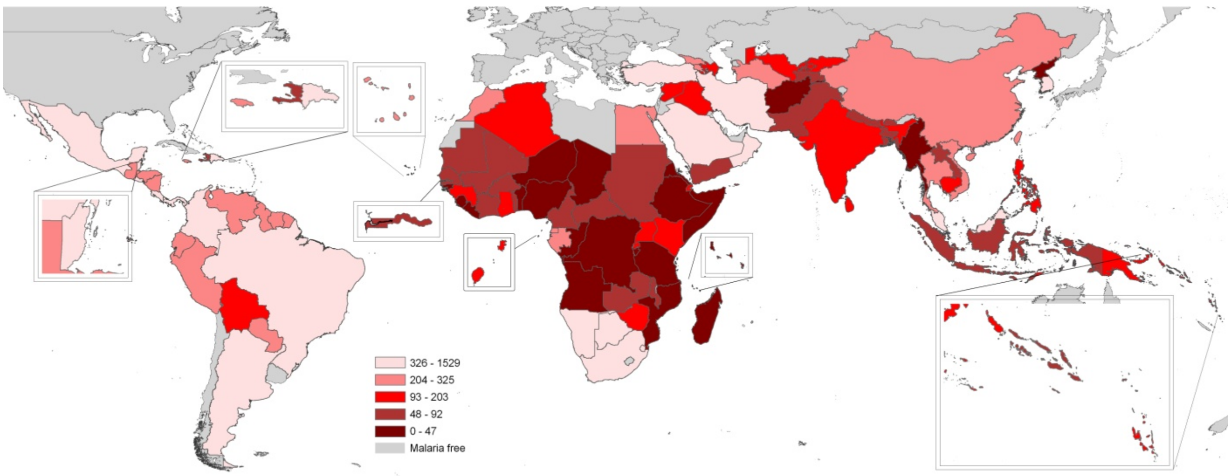

Figure S1.9. Overall per capita health expenditure in US$ at average exchange rates for every malaria endemic country in 2006.

1.2.1.2 Testing the sensitivity of dataset choice

Given that changes in governments and political stability can occur rapidly, we here examine the effects on overall rankings of using the 2007 data on political stability and government effectiveness to assess the magnitude of effects on overall results through one year of change. The 2007 Political Stability and Absence of Violence index data, and the 2007 Government Effectiveness index data were obtained for each *P. falciparum* endemic country. The overall feasibility analyses were then re-run using (i) the 2007 political stability data rather than the 2008 data, keeping all other factors the same, and (ii) the 2007 government effectiveness data rather than the 2008 data, keeping all other factors the same. The absolute average rank difference for the political stability change was just 1.03, while the same measure for government effectiveness was just 0.45. The breakdown of these changes by country can be seen in figures S1.10 and S1.11, and demonstrates that the overwhelming majority of countries displayed little or no change in rank. Just four countries showed average rank changes greater than 10, and all these were due to changes in political stability, demonstrating the need to update results with new information when available, in order to capture these outliers.

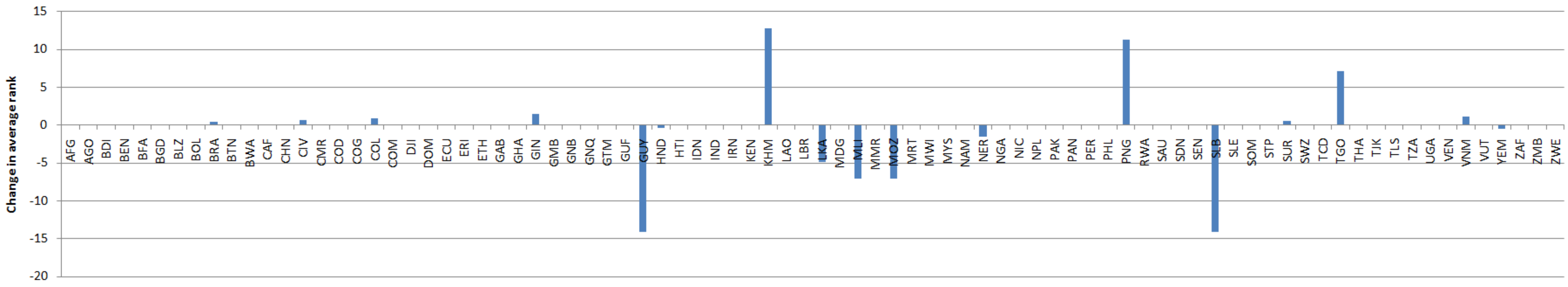

Figure S1.10. Change in average rank for each *P. falciparum* malaria endemic country when switching from using the 2008 to 2007 political stability and absence of violence indices.

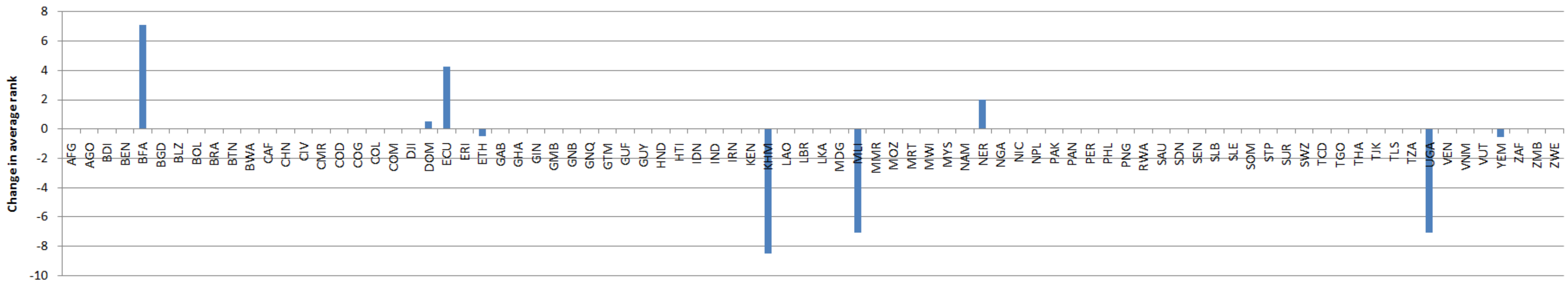

Figure S1.11. Change in average rank for each *P. falciparum* malaria endemic country when switching from using the 2008 to 2007 government effectiveness indices.

1.2.2 Health systems

The performance and infrastructure of the health system within a country is integral to the success of malaria elimination, and needs to be capable of providing near-universal access to high quality diagnosis and treatment. These qualities are important to guarantee sufficient coverage and specificity for passive case detection. Countries that have previously been successful in eliminating malaria all had well developed general health services with extensive human and physical resources, and a firm financial commitment to sustaining and improving these services[21].

There exist a wide range of national health system related indicators of varying levels of completeness and comparability[27], and a range of studies that attempt to compare differing aspects of the quality and capacity of national health systems using these e.g.[28-30]. The World Health Report 2000[30] defined a health system as including all organizations and people whose primary role is to promote, restore or maintain health, and identified four key functions of a national health system: (i) stewardship (often referred to as governance or oversight), (ii) financing, (iii) human and physical resources, and (iv) organization and management of service delivery. With governance, financing and organization examined in the previous section, we focus here on contemporary indicators of the relative resources, processes and impacts of health systems in each country.

With only a select few basic indicators measured in a relatively comparable, reliable and consistent way across all malaria endemic countries[26-28, 31], measures of relative health system performance that are specifically relevant for malaria elimination (access to treatment, diagnosis quality, drug supply and health management information system quality) are generally unavailable or incomplete. Moreover, the majority of well reported health statistics are relatively static resource-based measures, such as physicians or hospital beds *per capita*[26], which do not inform on the contemporary performance of the health system. Thus, the use of more process and impact-based measures has been advocated as part of recent thinking on conceptualizing health systems within countries as dynamic systems[32], and here we examine two types: immunization coverages and antenatal/birth attendance coverages.

Bos and Batson[33] outline the usefulness of immunization coverage data as a proxy for health system performance. Firstly, immunization coverage data can serve as an indicator of a health system's capacity to deliver essential services to the most vulnerable members of a population and has been shown to be significantly related to health worker densities e.g.[34]. Secondly, immunization is a health output with a strong impact on child morbidity, child mortality and permanent disability. Information on coverage levels provides not just a measure of the implementation of one health intervention, but a proxy for the overall capacity of the health system to support priority health interventions. Thirdly, the target group consists of zero- to one year old children, and the members of the group consist of the cohort of children born each year. Immunization coverage is therefore a sensitive indicator: if measured annually, it can provide timely evidence of improvement and deterioration in current services. Fourthly, the measurement of immunization coverage can be relatively straightforward and inexpensive, and results in valid and verifiable information, while definitions used in surveys and health information systems to measure immunization coverage can be precise and objective, enabling comparisons across countries and over time. Finally, immunization coverage rates are useful (i) to monitor progress in expanding essential health services in adverse health settings, and (ii) as "safeguard" indicators when health system reforms are changing delivery or financing of health services in settings in which immunization coverage is already high. While not all immunization coverage data are reliable or precise, and comparability over time is sometimes limited, these five aspects highlight the value of immunization coverage data and, as such, this measure was adopted here as a dynamic indicator of successful health system processes and impacts.

Data on coverages for a range of immunizations were obtained for every *P. falciparum* and *P. vivax* MEC for the period 2000-2008[35]. These included the proportion of 1-year olds given the first and third dose of diphtheria and tetanus toxoid with pertussis vaccine (DTP1 and DTP3), the measles-containing vaccine (MCV), the third dose of polio vaccine (Pol3), third dose of hepatitis B vaccine (HepB3), the bacille Calmette-Guérin (vaccine against tuberculosis, BCG) and the third dose of Haemophilus influenzae type b vaccine (Hib3). The Hib3 and HepB3 statistics included missing data for many countries, and were thus not given further consideration. Further, the coverage for delivery of DTP3 was chosen as a more representative measure of health system performance than DTP1, which showed lower variance in values between countries. The data for the remaining immunizations are shown in Figures S1.12-15, and a scatterplot showing the relationship between country rankings for each immunization coverage is shown in Figure S1.16.

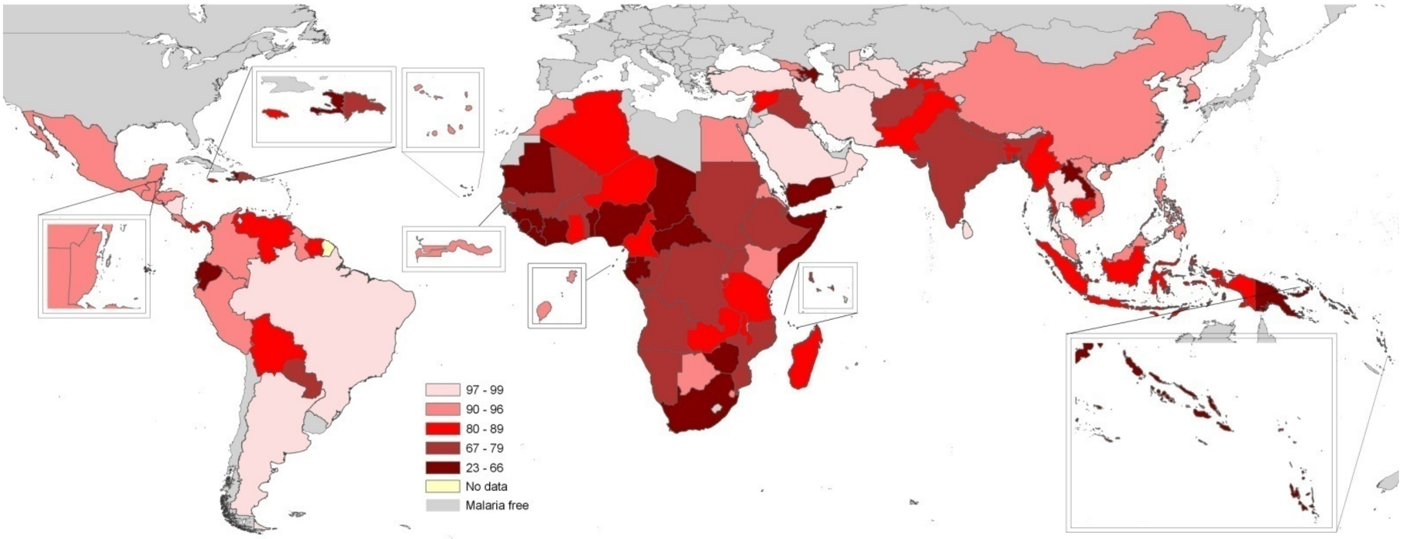

Figure S1.12. Proportion of 1-year olds given Measles Containing Vaccine (MCV).

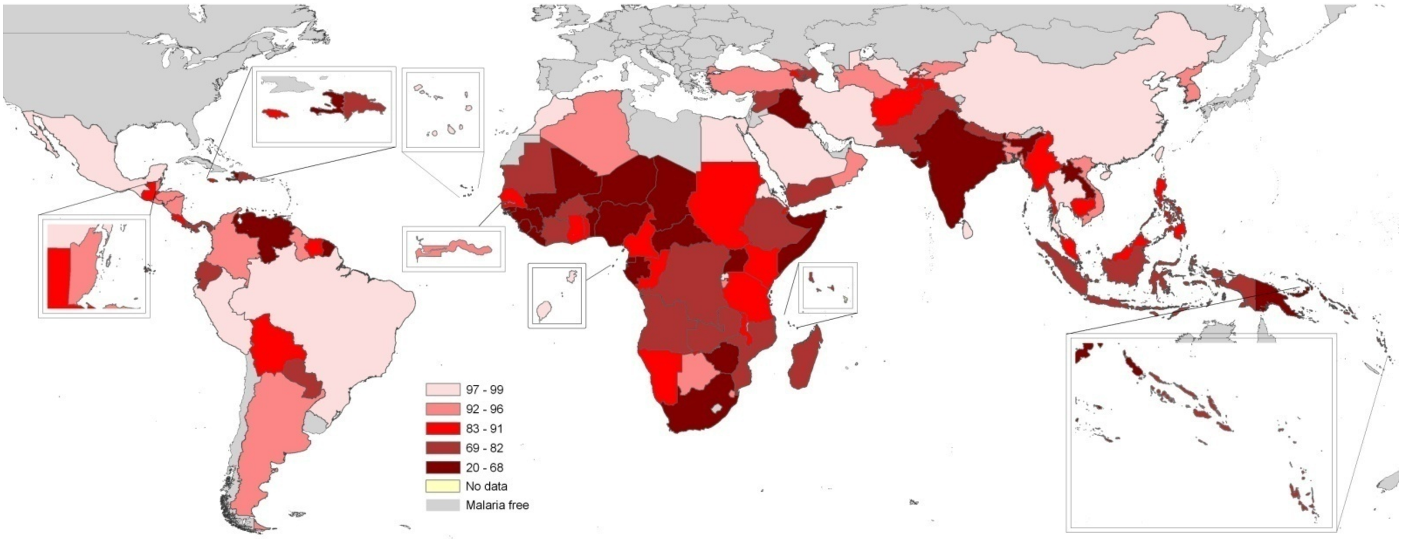

Figure S1.13. Proportion of 1-year olds given third dose of diphtheria and tetanus toxoid with pertussis vaccine (DTP3).

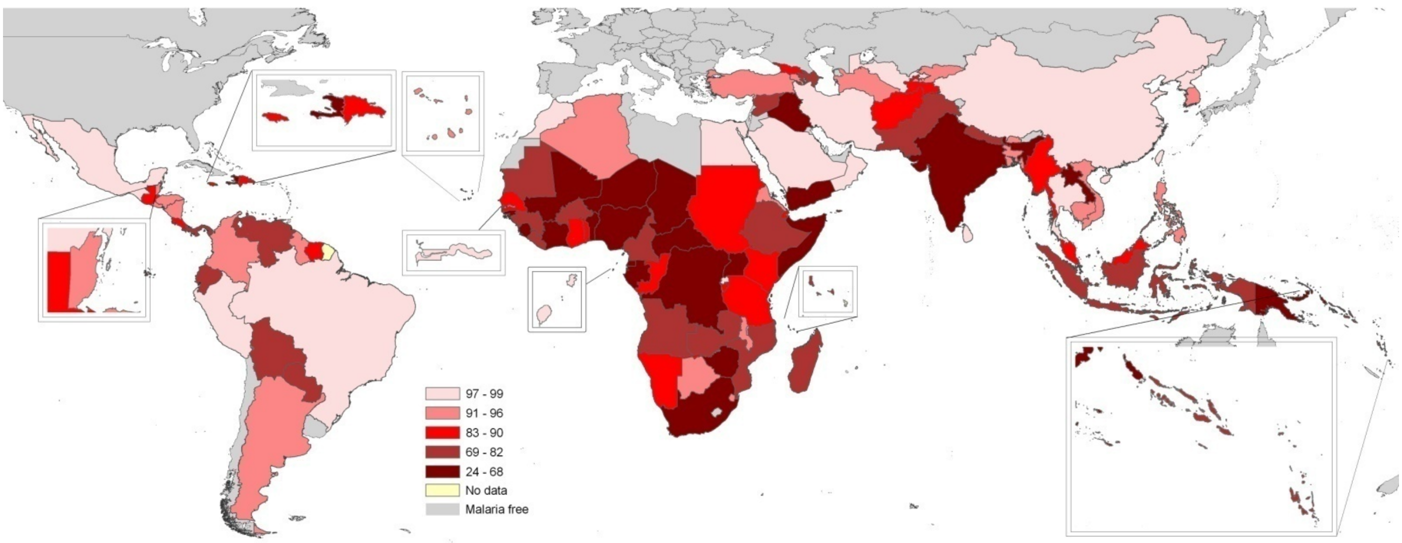

Figure S1.14. Proportion of 1-year olds given third dose of Polio vaccine (POL3).

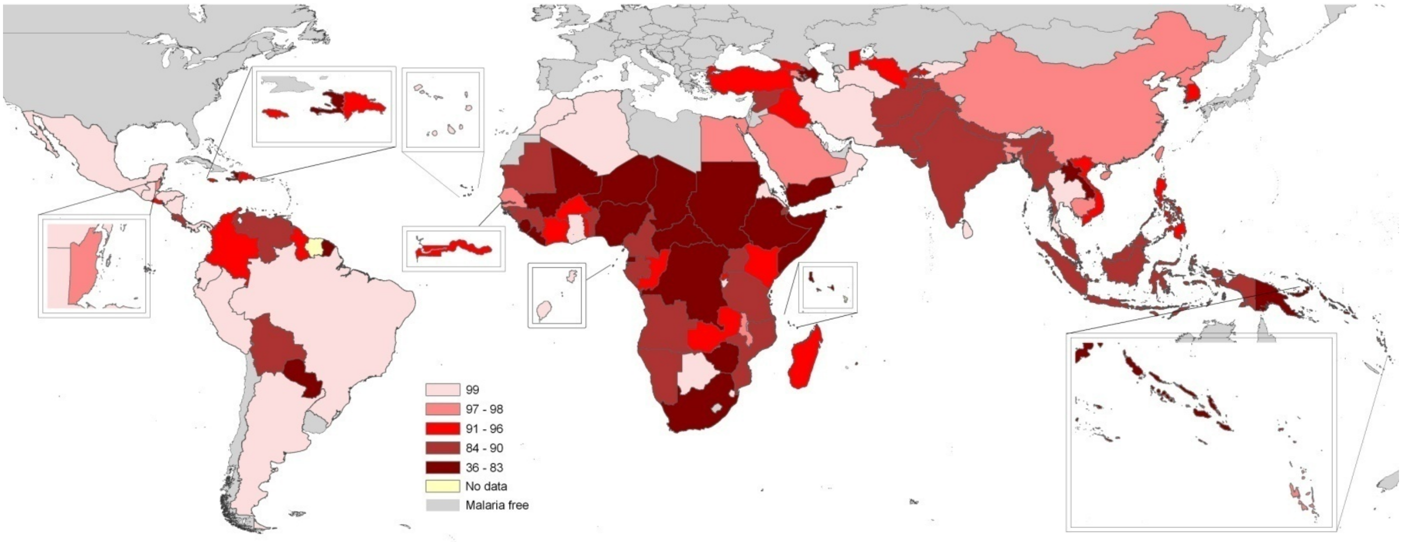

Figure S1.15. Proportion of 1-year olds given bacille Calmette-Guérin (vaccine against tuberculosis) (BCG).

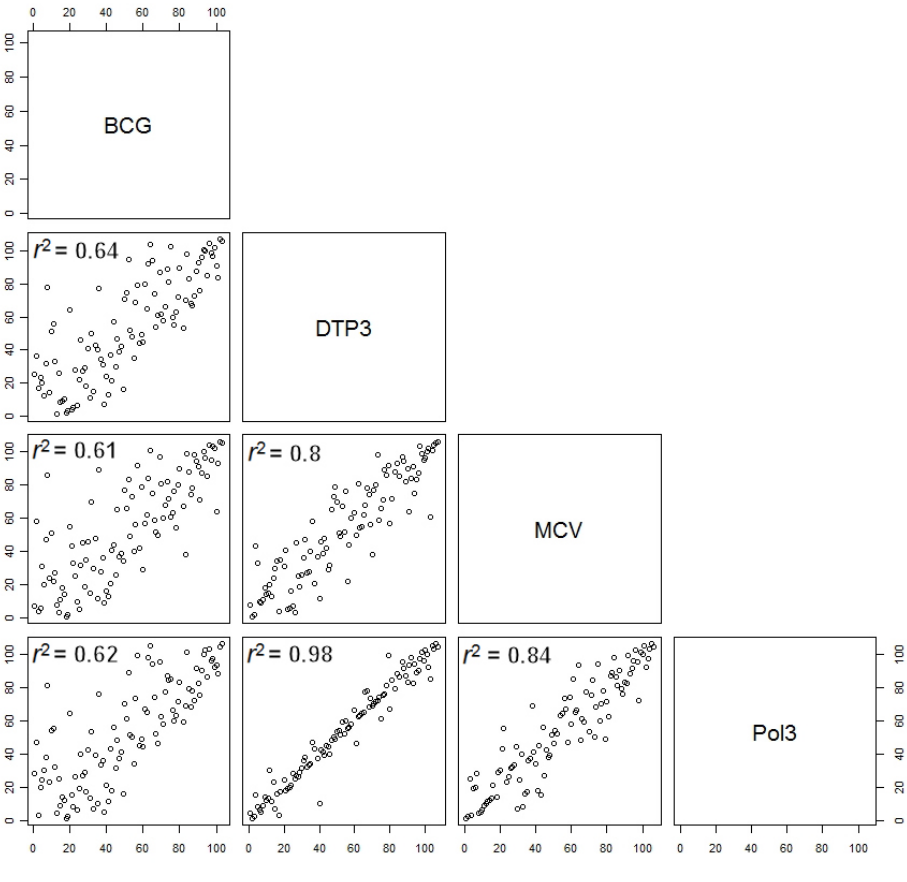

Figure S1.16. Scatterplot of malaria endemic country rankings for four types of immunization coverage. All relationships are significant at the *p*<<0.01 level.

Figure S1.16 shows that BCG has the weakest relationship with the other immunization types. An examination of the variance of coverage levels between malaria endemic countries showed a substantially lower value for BCG (BCG = 134, DTP3 = 276, MCV = 245, Pol3 = 263), with values uniformly high, meaning that it represented a less sensitive variable in quantifying differences between health systems and was therefore not considered for further analysis. Finally, to test the sensitivity of results to the choice of the remaining three EPI coverage statistics used, we examined the average overall elimination feasibility rankings produced for each country by holding all factors constant except the EPI statistics. We examined the effects on results of using all possible combinations of EPI coverage statistics, including the use of each type individually and averages of two and all three types. Figure S1.17 shows the maximum range of average ranks that were produced for each country. In general, this shows that the results are relatively insensitive to EPI coverage statistic choice, except for a few countries where individual coverage rates for differing immunizations vary widely. In these cases, the use of averages of coverage statistics for different immunizations produced more stable results and therefore an average of the coverage statistics for all three types was used in the final analyses (figure S1.18).

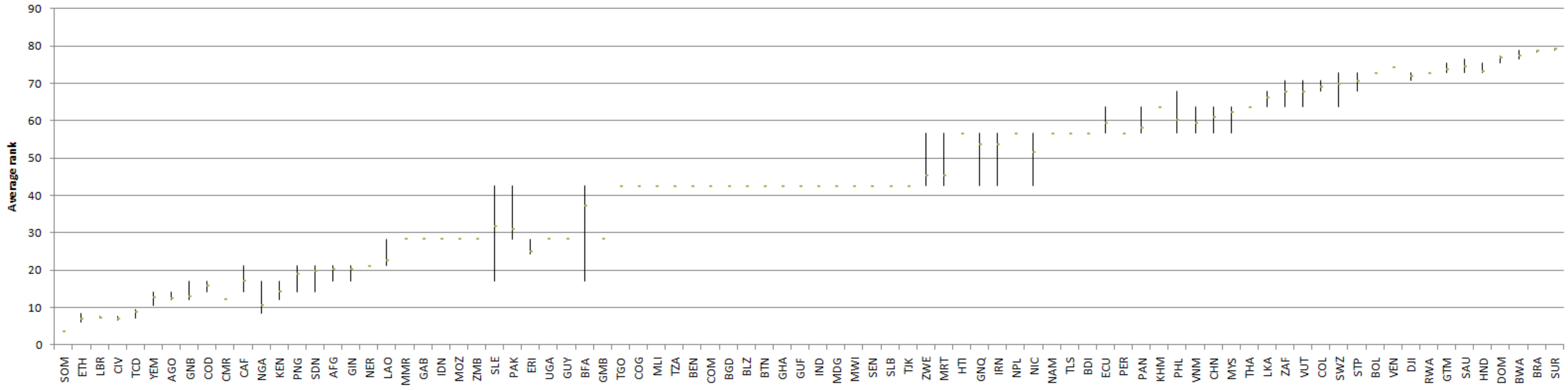

Figure S1.17. Maximum difference in average rankings for each *P. falciparum* malaria endemic country when using all combinations of EPI coverage statistics.

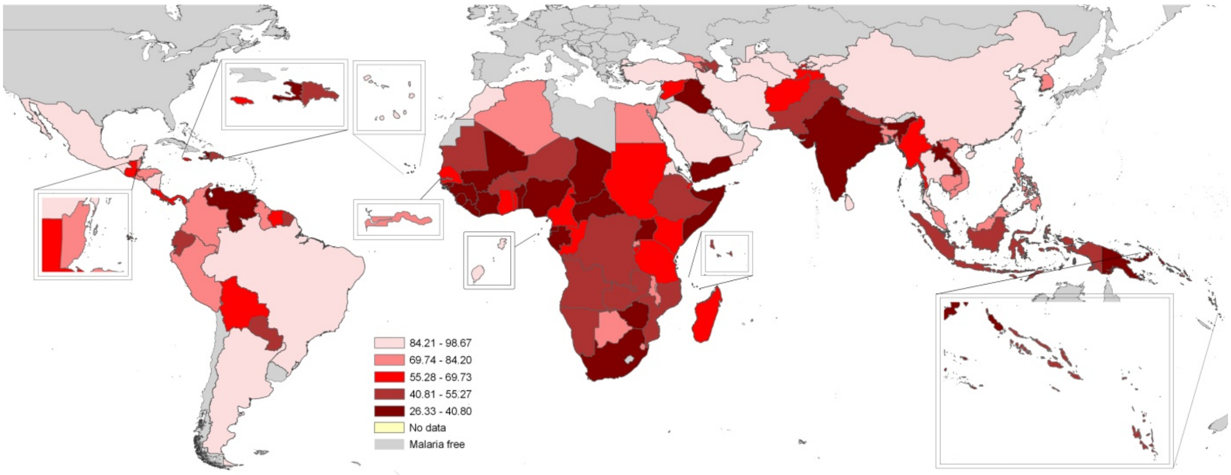

Figure S1.18. Average coverage percentages of the third dose of diphtheria and tetanus toxoid with pertussis vaccine (DTP3), the measles-containing vaccine (MCV) and the third dose of polio vaccine (Pol3) for each malaria endemic country in 2008.

Antenatal care and birth attendance by skilled personnel represent a second set of essential services to vulnerable populations and are both health outputs with strong impacts on maternal mortality[36]. Moreover, both are sensitive indicators which, by being measured annually, provide timely evidence of the state of current maternal services. While, like EPI coverage, births attended by skilled personnel (PERS) indicates the ability of a health system to deliver services, antenatal care coverage (ANCC) provides more of a complimentary indicator of health system access and utilization through data on the percentage of women who used antenatal care provided by skilled health personnel for reasons related to pregnancy at least once during pregnancy, as a percentage of live births 2000-08.

Data on ANCC and PERS were obtained for every *P. falciparum* and *P. vivax* MEC for the period 2000-2008[35]. ANCC by country is shown in figure S1.19, and PERS by country is shown in figure S1.20, while a scatterplot showing the relationship between the two is shown in Figure S1.21.

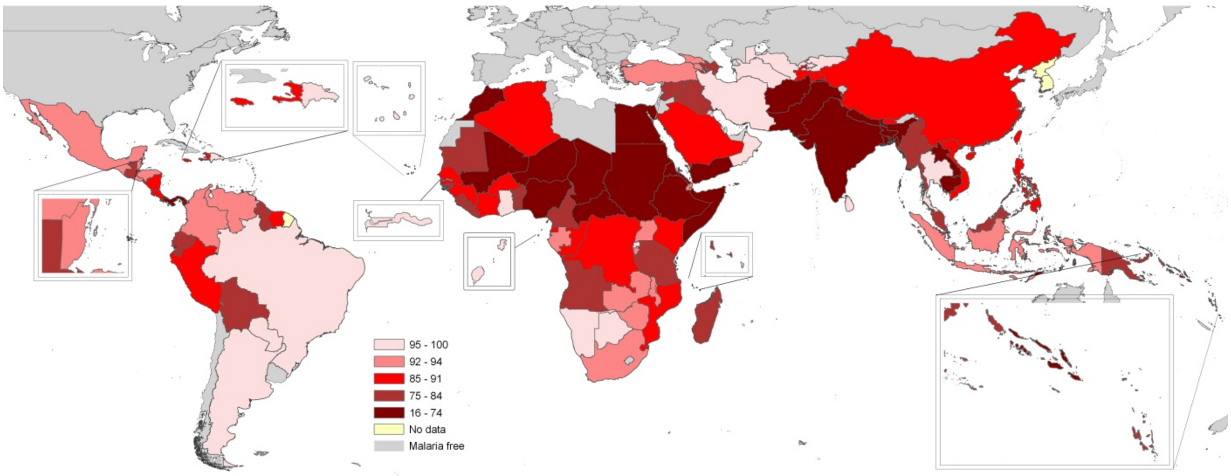

Figure S1.19. Antenatal care coverage percentages for each malaria endemic country for the period 2000-08.

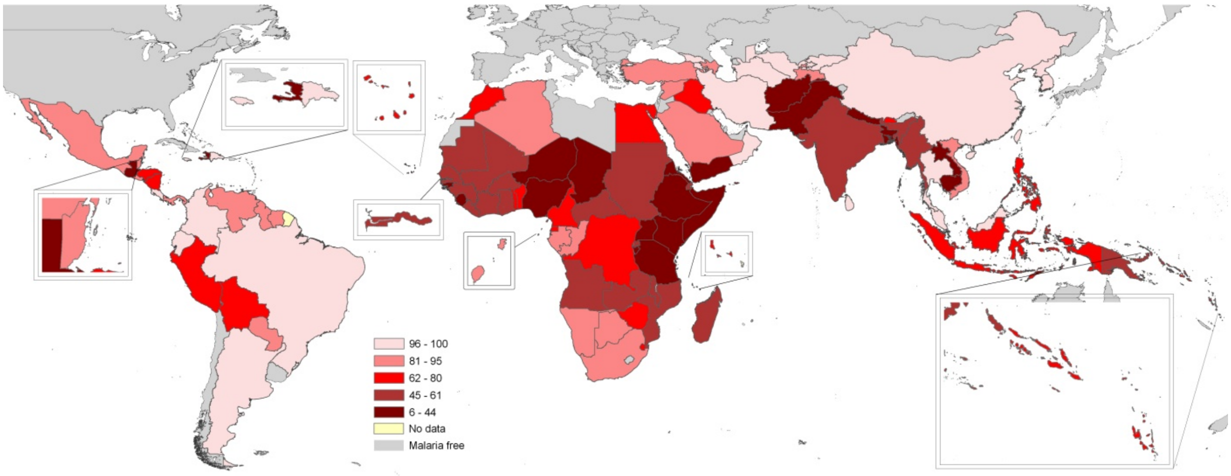

Figure S1.20 Births attended by skilled health personnel (%) 2000-08 (PERS).

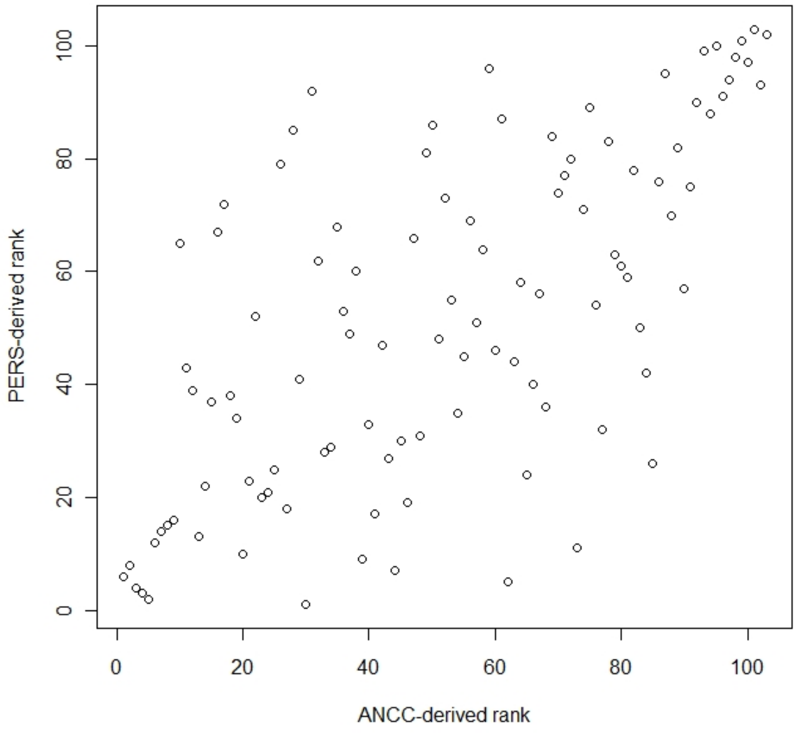

Figure S1.21. Scatterplot of *P. falciparum* malaria endemic country rankings for antenatal care coverage (ANCC) versus births attended by skilled health personnel (PERS) (r^2 = 0.444, p<<0.01)

Figure S1.21 shows that a significant relationship between ANCC and PERS exists, but that there are some substantial differences, particularly in the mid-range rankings. Therefore, the magnitude of the effects of using each dataset on overall results was examined.

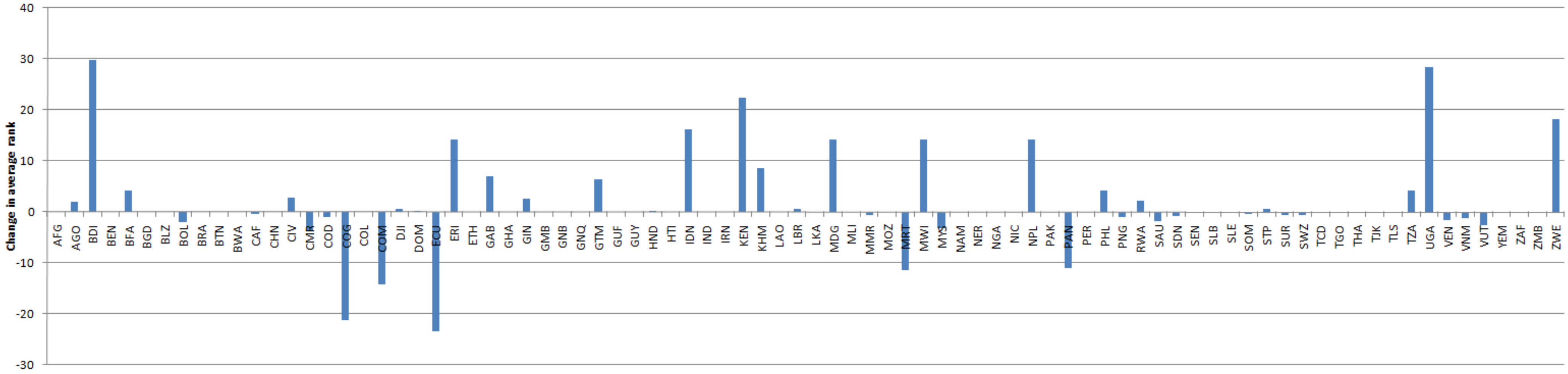

Figure S1.22. Change in average rank for each *P. falciparum* malaria endemic country when switching from using the ANCC to PERS indicators.

The overall feasibility analyses were re-run using (i) ANCC, and (ii) PERS, keeping all other factors the same. The results of these comparisons are shown in Figure S1.22, and demonstrate zero or little change in average ranking for the majority of countries, but larger changes for a selection of countries. These results demonstrate that either statistic could be used and that the consequences of this choice result in minimal changes to overall conclusions for the majority of countries. Given that ANCC provides more of a complimentary indicator to EPI of health system access and utilization, this was chosen over PERS, which, like EPI, is more reflective of service delivery.

1.2.3 Populations at risk

The feasibility of elimination will be affected by (i) the number of people at risk, which determines the scale of the problem to be tackled; (ii) the proportion of the total national population that are at risk, which determines the ability of the government to deal with eliminating transmission in these populations; and (iii) the difficulty in accessing populations at risk, which presents a logistical and financial obstacle to success in achieving elimination. The requirement for these three demographic indicators can be illustrated by considering the situation in Brazil. Compared to other MECs, Brazil has a large population at risk of stable *P. vivax* transmission (12.9 million) presenting an operational challenge in terms of numbers requiring intervention coverage and treatment, but these make up just 6.9% of the total population, presenting less of a burden to the government than MECs where the entire population is at risk. However, with the majority of those at risk situated within the Amazon or on its frontier[37, 38], accessing these populations to deliver the required level of intervention and treatment dictated by technical feasibility assessments presents challenges, as has been encountered previously[39].

An evidence-based map outlining the global extent of stable *P. falciparum* transmission[1] enabled the estimation of the total populations at risk of stable *P. falciparum* malaria transmission in each country. Similar approaches were followed to create an evidence-based map for *P. vivax*, and a full description can be found in[40]. In brief, 105 countries where *P. vivax* transmission is occurring were identified by cross-referencing information from the Global Malaria Action Plan[41] with the CDC Health Information for International Travel 2010 book[42] and a range of national surveys and personal communications. Ten of these countries: Algeria, Armenia, Egypt, Jamaica, Mauritius, Morocco, Oman, Russian Federation, Syrian Arab Republic and Turkmenistan, have either interrupted transmission or are extremely effective at dealing with minor local outbreaks, and we did not classify these nations as malaria endemic. Information on *P. vivax* free areas was extracted from international travel health guidelines and mapped. Annual parasite incidence (API) data were then used to identify stable and unstable transmission areas (as defined by Guerra et al[1]), as well as to further refine the spatial mapping of *P. vivax* free areas. Using *P. vivax* specific temperature - sporogony relationships, areas where transmission is temperature limited were then excluded. The resulting limits of *P. vivax* transmission are shown in Figure S.1.23.

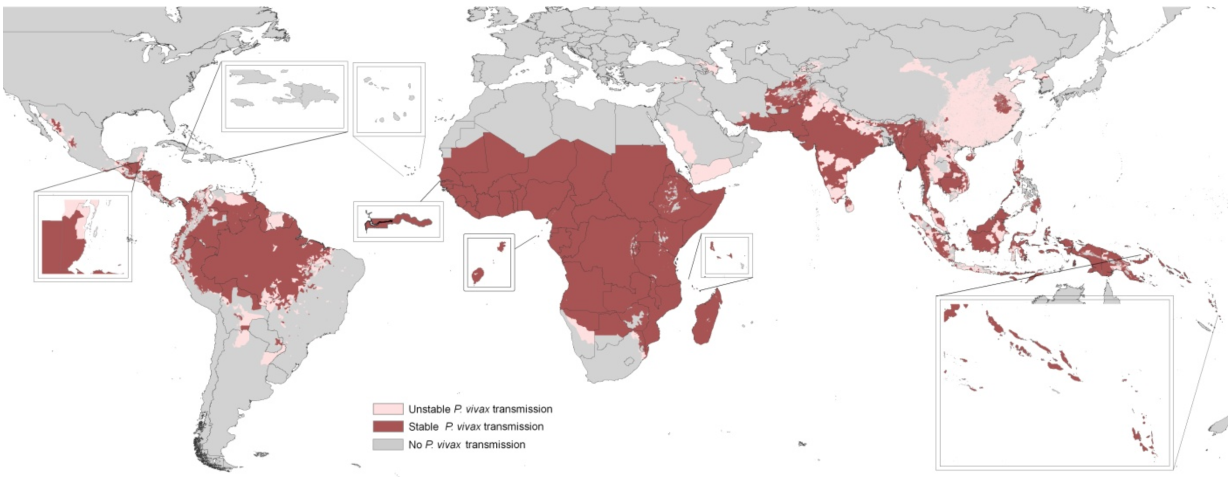

Figure S1.23. *P. vivax* malaria risk, with areas defined as no risk, unstable or stable transmission.

These maps were overlaid onto the GRUMP *alpha* gridded population surface[3] and total populations residing in *P. falciparum* and *P. vivax* stable transmission zones per country were extracted. The population at risk of *P. vivax* transmission is modulated by the frequency of Duffy negativity[43], since such individuals are refractory to infection. A model-based geostatistical map of the proportion of Duffy negative individuals (Fya and Fyb antigen) in prevalence surveys (*n*=244) was thus created (Figure S1.24), and used to rescale the *P. vivax* populations at risk, where population at risk = population residing in stable transmission zones × (1 - frequency of Duffy negative individuals).

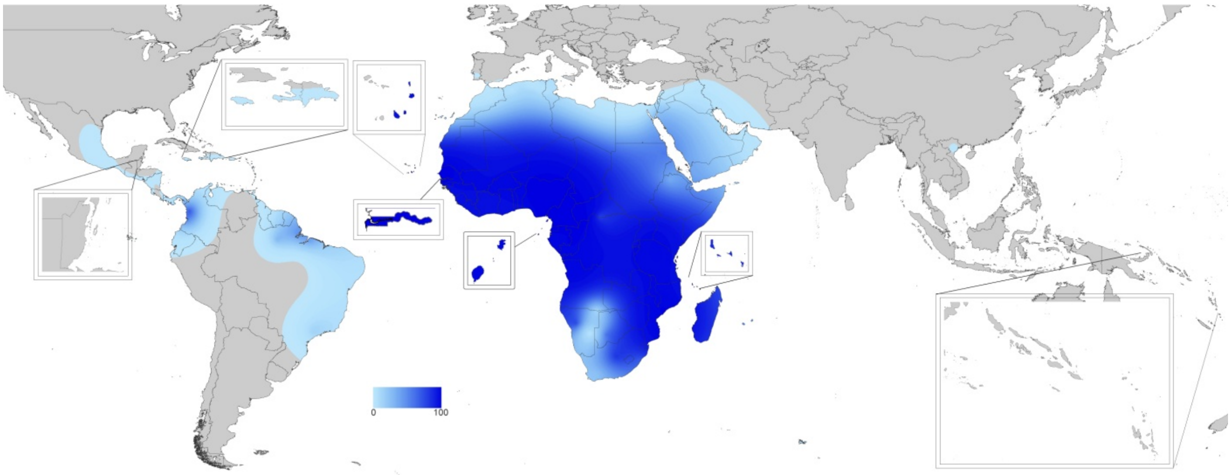

Figure S1.24. A model-based geostatistical map of the proportion of Duffy negative individuals (Fya and Fyb antigen) in prevalence surveys (*n*=244).

These are shown in supplemental figures S1.25 and S1.26, and Table S1.1. Further, the proportions of the total national population that these numbers represented were calculated and are shown in supplemental figures S1.27 and S1.28, and Table S1.1.

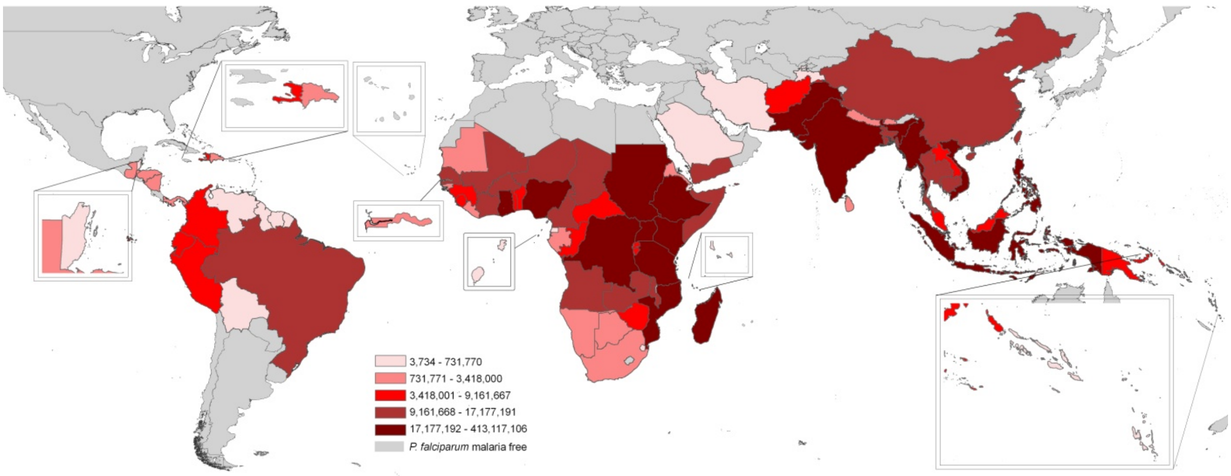

Figure S1.25. Numbers of people residing in areas of stable *P. falciparum* transmission for each endemic country in 2007.

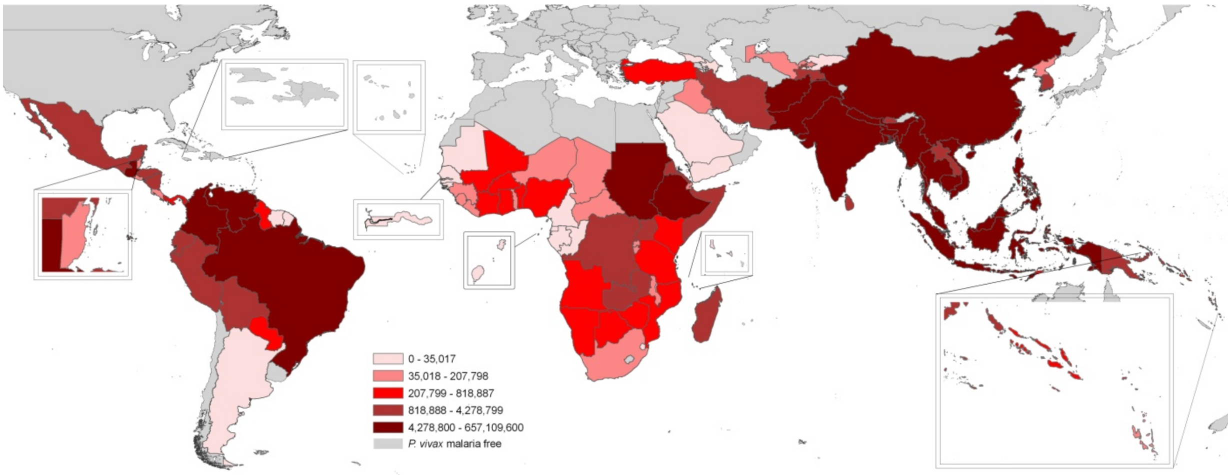

Figure S1.26. Numbers of people residing in areas of stable *P. vivax* transmission for each endemic country in 2007.

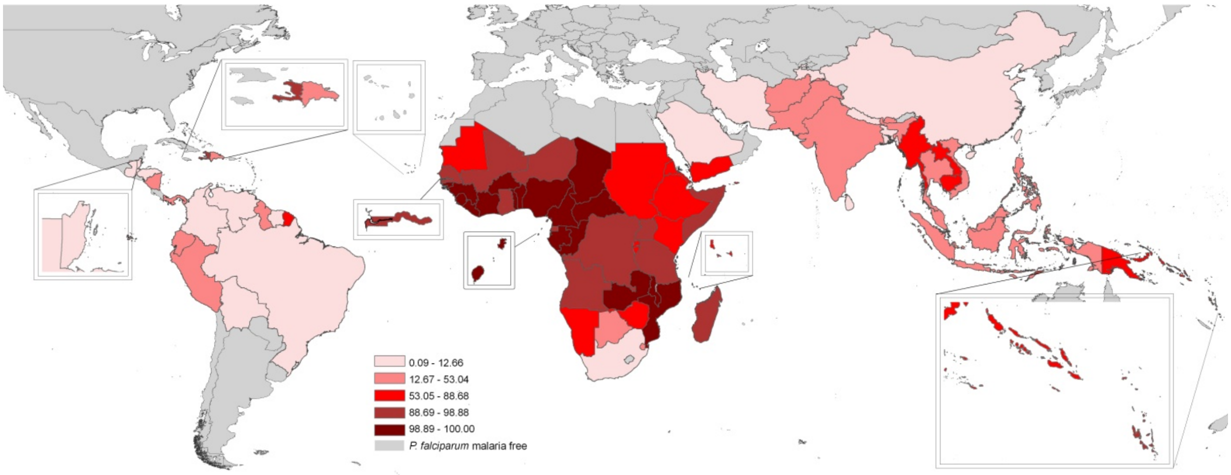

Figure S1.27. The percentage of the total national population who lived in areas of stable *P. falciparum* transmission in 2007.

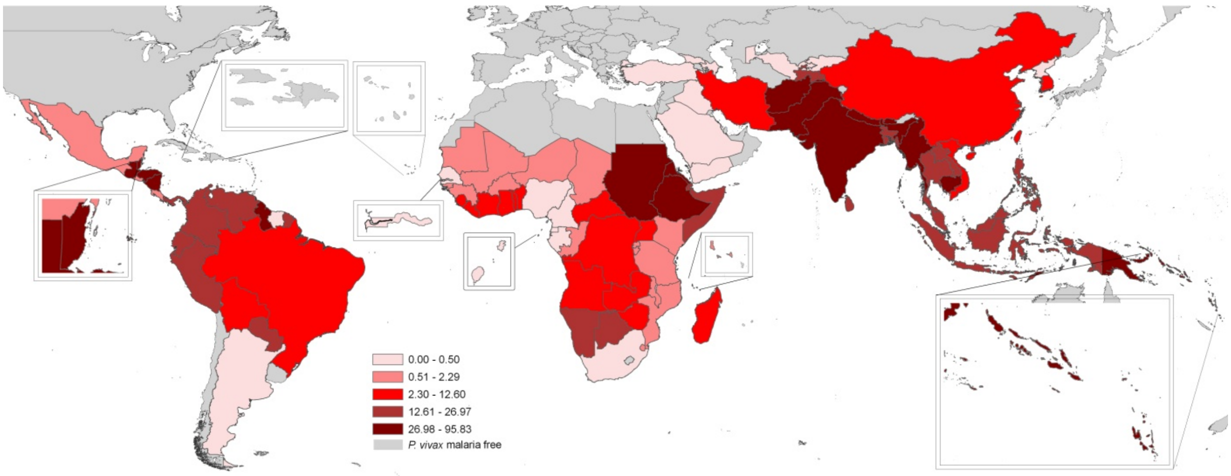

Figure S1.28. The percentage of the total national population who lived in areas of stable *P. vivax* transmission in 2007.

Accessibility can be measured in units of time taken to reach a location of interest from any other location. Gridded estimates of time taken to reach the nearest substantial settlement (defined as population >50,000) using land or water based travel were recently estimated globally to produce a world map of accessibility[44] (Figure S1.29). This global map was computed using a cost-distance algorithm that computed the "cost" of travelling between two locations on a regular raster grid. This cost was measured in units of time, and the cells in the grid contain values which represent the cost required to travel across them, hence this raster grid is often termed a friction-surface. The friction-surface accounts for information on road quality; rail, river and sea transport; and environmental factors such as topography, geographical barriers and land cover types that affect travel times between locations. For Vanuatu, Comoros and Timor-Leste, where the largest settlements used were smaller than 50,000 people, the accessibility map was recalculated based on the largest settlement in each country.

The global accessibility map provides a consistent and comparable basis for measuring the per-country accessibility to populations at risk of *P. falciparum* or *P. vivax* malaria. This accessibility is measured from the nearest substantial settlement, at which primary health facilities are based and from which intervention and control efforts are coordinated and launched. For each country the limits of *P. falciparum*[1] and *P. vivax* (Figure S1.23) malaria transmission were used in combination with the GRUMP *alpha* population surface[3] to map all populations living in areas of either *P. falciparum* or *P. vivax* malaria transmission. The global accessibility surface was then overlaid and for each country and the average population-weighted accessibility value was calculated. This provided indicators of the relative level of difficulty that will be faced in accessing populations at risk of *P. falciparum* and *P. vivax* malaria in a country. These are shown in figures S1.30 and S1.31, and Table S1.1.

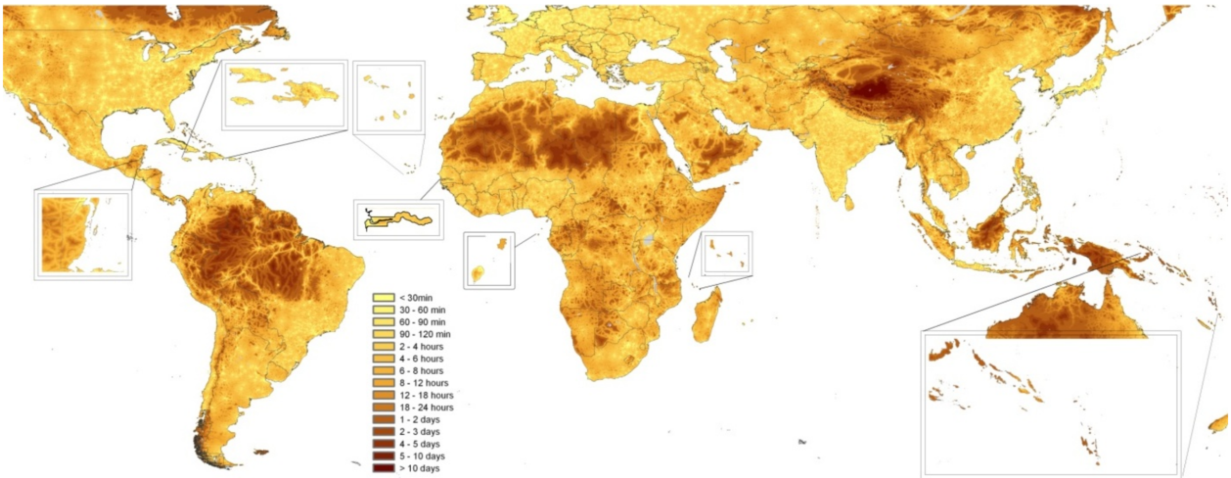

Figure S1.29. Travel times to reach the nearest settlement of size >50,000 people in 2007 (adapted from [44]). The darkest colours show the least accessible regions.

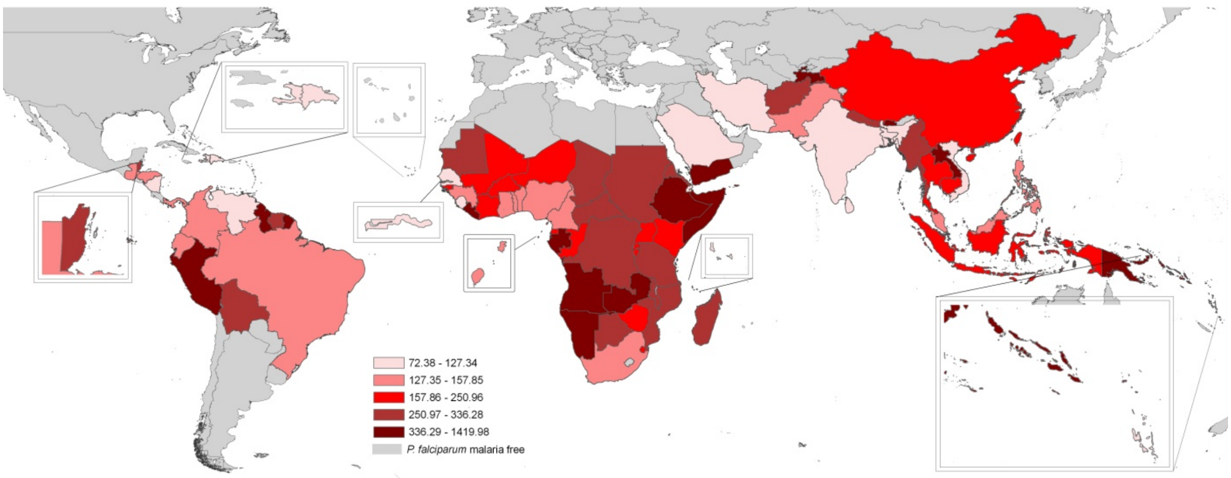

Figure S1.30. Mean population-weighted accessibility index score for the areas of *P. falciparum* transmission in each endemic country in 2007. High scores indicate poor accessibility.

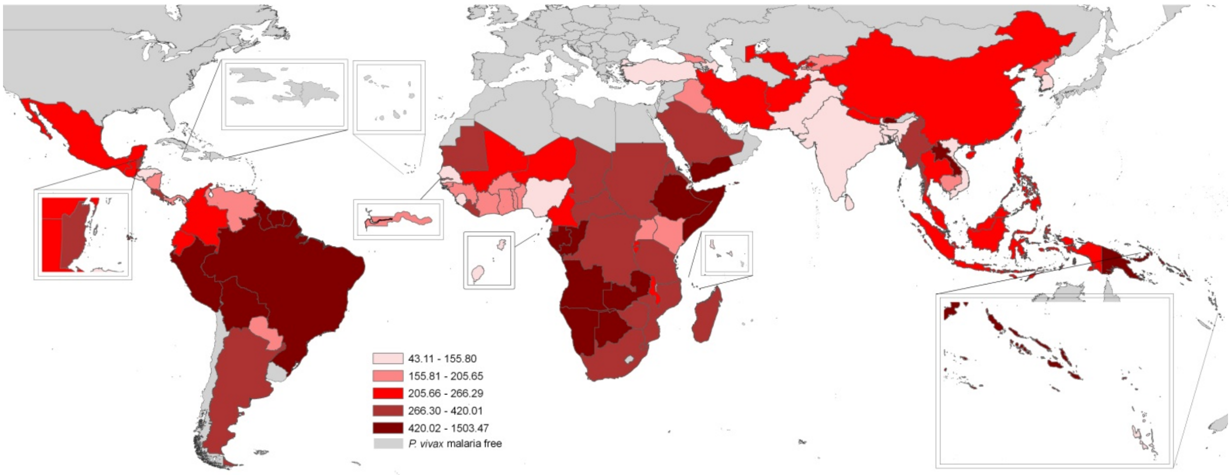

Figure S1.31. Mean population-weighted accessibility index score for the areas of *P. vivax* transmission in each endemic country in 2007. High scores indicate poor accessibility.

2. Combining indicators

2.1 Introduction

Composite or summary measures are increasingly being recognised as a useful tool in policy analysis and public communication. They provide simple comparisons of entities of interest that can be used to illustrate complex and sometimes elusive issues in wide ranging fields, e.g. environment, economy, society, health or technological development[45]. Composite indicators are now widely used in public policy and health policy debates[46]. Familiar examples include the Human Development Index[47] and deprivation indices[48]. Few would claim that these examples reveal everything of importance concerning state of development or wealth. Yet because of their comprehensibility and the advantages of simplicity of communication and concision, composite measures have become as much an established part of the policy debate in health as in other fields.

In general terms, an indicator is a quantitative or a qualitative measure derived from a series of observed facts that can reveal relative positions (e.g., of a country) in a given area. When evaluated at regular intervals, an indicator can point out the direction of change across different units and through time. They can also be helpful in setting policy priorities and in benchmarking or monitoring performance. A composite indicator is formed when individual indicators are compiled into a single index on the basis of an underlying model. However, composite indicators can send misleading policy messages if they are poorly constructed or misinterpreted. Their "big picture" results may invite users (especially policy makers) to draw simplistic analytical or policy conclusions. Instead, composite indicators must be seen as a starting point for initiating discussion and attracting public interest[45].

The strengths and weaknesses of composite indicators largely derive from (i) the quality of the underlying variables, and (ii) the subjectivity involved in their construction. Ideally, variables should be selected principally on the basis of their relevance, analytical soundness, timeliness and accessibility. Here, the variables used and their criteria for selection are outlined in detail in supplemental information 1. Composite indicators and their construction often face a degree of scepticism among statisticians, economists and other groups of users. This scepticism is partially due to the lack of transparency of some existing indicators, especially as far as methodologies and basic data are concerned. To avoid these risks, in this study we make available the full input datasets used and in the remainder of this document, we describe the benefits and drawbacks of approaches for weighting indicators in composite ranking methods.

A range of methodologies for constructing composite measures exist, each with their own advantages and disadvantages. The strongest justification for a composite indicator lays in its fitness to the intended purpose and its acceptance by peers[45]. A new era of global spatial data means that planning for malaria elimination programmes can now rely on a strong evidence base to complement and guide strategies, rather than being driven by subjective or political decisions. Sufficient, comparable data on a broad range of factors common to all countries that have ever been successful in eliminating malaria now exist (see section 1), enabling construction of composite rankings of current malaria endemic countries by elimination feasibility. However, a range of methodologies for constructing such composite measures exist, each with their own advantages and disadvantages, as well as levels of appropriateness for malaria elimination feasibility assessment. Here we describe four categories of approach, providing an example of each. We restrict our focus here to broad categories of approaches that are most relevant to the assessment of elimination feasibility, and briefly discuss their appropriateness. Further details and wider discussions on composite indicators and their construction and alternatives to ranking can be found elsewhere[45, 46, 49-53].

2.2 **Methods for composite ranking creation**

2.2.1 Equal weightings

One of the simplest approaches to composite ranking is to define the composite as a linear aggregate of the key factor values, or the ranks of the key factors. Most existing composite indicators rely on equal weighting, i.e., all factors are given the same weight. This can correspond to the case in which all factors are "worth" the same in the composite but it can also disguise the absence of statistical or empirical basis, e.g. when there is insufficient knowledge of causal relationships or a lack of consensus on the alternative. In any case, equal weighting does not mean "no weights", but implicitly implies that the weights are equal[45].

The Human Development Index[47] represents an example of this approach and is simply a linear aggregrate of rescaled life expectancy, income per capita and literacy, where the weights are one-third for each. This additive form has the advantage of simplicity of calculation and ease of communication and comprehension. Often, as with the human development index, the use of more complex options for defining composite measures is not pursued because there is no theoretical or empirical basis to postulate alternative forms. However, the approach inherently assumes that each factor considered is equally important and can give undue influence to extreme values in a single factor. For instance, consider countries x, y and z, measured using a composite index of equal weightings of factors A, B and C (table 2.1).

Country	Factor A	Factor B	Factor C	Composite
x	0.43	1	1	0.81
y	0.37	0.82	0.58	0.59
Z	0.3	0.99	0.22	0.5

Table 2.1. Hypothetical data illustrating equal weighting composite construction

Here we see that country *x* scores higher than *y* and *z* on all three factors, so any reasonable ranking method would rank *x* higher than *y* and *z* – i.e. country *x* is intrinsically better than *y* and *z* according to these data. A different picture emerges when comparing *y* with *z*. Country *y* is better on factors A and C, but *z* is better on factor B. The approach described above equally weights each factor to create a composite index to decide that country *y* is better overall. Thus, a subjective decision is made that factors A, B and C are equally important in defining the composite index. A different composite ranking approach might have *z* out-ranking *y* if it was found that factor B was more important (for instance, through methods outlined in sections 2 and 3 below). Alternatively, it could be deemed that countries *y* and *z* are not intrinsically comparable with respect to the three factors (for instance through methods outlined in section 4 below). An alternative example is presented in Box 2 of the main manuscript, illustrating a linear aggregation of the ranks of factors.

Equal weighting represents the simplest and most straightforward methods for obtaining a simple ranking of malaria endemic countries (MECs) by elimination feasibility. However, we have no prior information on the relative importance of each key factor in determining elimination feasibility (though it can also be argued that we can attempt to acquire some – see sections 2.2.2 and 2.2.3 below), and therefore, assuming that each factor should be definitively given an equal weighting ultimately represents an undesirable approach.

2.2.2 Expert consultation based weightings

The choice of the weightings for each factor can be based on some arbitrary choice, as described above, or 'expert' opinion can be sought. Participatory methods that incorporate various stakeholders, experts, citizens and politicians, can be used to assign weights. An example of such an approach was taken for the World Health Report 2000[30], with weights based on survey of preferences of informed individuals (1007 individuals from 121 countries[54]) summarized into five chosen factors (See below and Evans et al[55]); health, health inequality, level of responsiveness, distribution of responsiveness and fairness of financial contribution. The results of this survey in terms of the weights for the five key factors overall were 0.24 for health, 0.25 for health inequality, 0.13 for level of responsiveness, 0.16 for distribution of responsiveness and 0.22 for fairness of financial contribution. To make the definition of the composite easier to understand, these survey results were rounded to the nearest one-eighth so that the final weights used were 0.25 for health, 0.25 for health inequality, 0.125 for level of responsiveness, 0.125 for distribution of responsiveness and 0.25 for fairness of financial contribution. Before applying these weights to calculate the composite, each component measure was rescaled on a 0 to 100 scale. The overall composite was, therefore, a number on the interval 0 to 100, with 100 being the highest possible level of attainment[56]. The expert consultation aspect of the approach produced a range of opinions on the importance of each feature, and this was exploited to provide accompanying measures of uncertainty in the final scores and rankings. Moreover, this range of opinions also enabled a sensitivity analysis to be undertaken to assess how much the rankings changed given the range of opinions expressed.

The expert consultation approach is feasible and often ideal when there is a well-defined basis for e.g. a national policy. For international comparisons, such references are often not available, or they deliver contradictory results[45]. The approach does have some attractive features for assessing malaria elimination feasibility, including the provision of a 'consensus' viewpoint, and the valuable by-product of diverse opinions for sensitivity analysis. However, there remain many key issues which make the adoption of the approach misaligned with the aims of this study, and each of which lends additional subjectivity to the analyses: (i) it is much more unclear how to define an 'expert' here than it is for other analyses where it has been employed, e.g. health system performance; (ii) the importance of differing factors in determining, for instance, a strongly performing health system, is likely to be much more widely agreed upon than the importance of differing factors in achieving malaria elimination; (iii) a large sample of opinions is needed for such an approach to be robust - whether there are enough people qualified to judge the importance of each of a wide range of spatially varying factors across the world in determining elimination feasibility is unclear.

2.2.3 Past study based weightings

One of the most robust and justifiable approaches to defining weightings and compositing indicators relies on past case studies on the issue being examined to empirically determine factor weightings. Examples of its application can be found in a range of recent work that attempts to define empirically the best set of indicators and weightings for a wide area assessment of deprivation through to local intensive surveys of key factors determining deprivation. An overview can be found in Capellari and Jenkins[57]. The success of the approach relies on the assumptions that (i) important factors today are measured equally as well as in the past, and that (ii) the relationship between the desired outcome index and the factors used to construct it are maintained through time. The approach is only covered briefly here, since these assumptions mean it likely represents the least applicable to malaria elimination feasibility assessment.

For malaria elimination feasibility assessment, this approach would build on the fact that malaria has been eliminated from numerous countries in the past, and that we can learn how important individual factors were from studying these past examples. The potential range of weightings found would also enable sensitivity analyses to be undertaken. The principal drawback with this however is data inter-comparability. The majority of these previous national eliminations occurred in the mid-20th century, when global datasets comparable to those used in these analyses on factors such as political stability, immunization coverages and migration did not exist. Though it may be possible to find comparable information on, for instance, common measures such as GDP or health expenditure for the specific countries and times of elimination, it is unlikely that data on all important factors could be captured. Moreover, the control tools available, the spatial distribution and size of populations at risk, health systems and human movement patterns, amongst other factors, were all significantly different.

2.2.4 Partially ordered sets.

As discussed already, the choice of weights can have a significant effect on the overall composite rankings. The partially ordered sets (posets) approach[58] is based on the notion that there will be no consensus on the importance, and thus weightings, of different factors in determining elimination feasibility. The more conventional solutions outlined above assign a composite numerical score to each object by combining information on each factor in some fashion. Consciously or otherwise, every such composite involves judgements (often arbitrary and thus controversial) about tradeoffs or substitutability among factors. The posets approach takes the more conservative view that the relative positions in factor space determine only a partial ordering, and that a given pair of countries may not be inherently comparable[46].

Box 2 in the main manuscript provides a brief example to illustrate the use and benefits of the posets approach. Formally, for factors i and j of countries a, b and c, if $a_i \le b_i$ and $b_j \le a_j$ then $a = b$, and if $a_{i,j} < b_{i,j}$ and $b_{i,j} < c_{i,j}$ then $a < b < c$. Thus, initial outputs of the posets methodology are ranked groups of countries, with countries assigned to each group only when there is clear information to do so. Given our relatively poor understanding of the importance of differing factors in determining malaria elimination feasibility, these features of the posets approach overcome some of the disadvantages outlined for approaches 2.2.1-3.

A finite poset can be visualized through its Hasse diagram[58], which depicts the ranking relations between pairs of elements and allows one to examine the whole partial order structure. Figure S2.1 below shows the Hasse diagram for the data presented in Box 2 of the main manuscript.

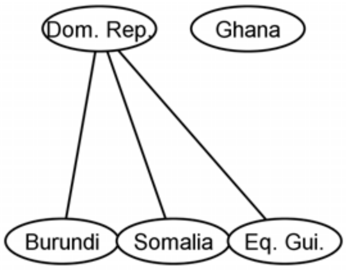

Figure S2.1. Hasse diagram illustrating the partial order structure for the example data presented in Box 2 of the main manuscript.

The factor values in Box 2 of the main manuscript for the Dominican Republic are unambiguously more favourable in terms of elimination feasibility than they are for Burundi, Somalia and Equatorial Guinea, so it is positioned in a set of its own above the three countries and connected to them to demonstrate this relationship in figure S2.1. There exists no evidence to inform on the relative elimination feasibility for Burundi, Somalia and Equatorial Guinea, so these are positioned alongside each other in a second set. Conflicting evidence exists for Ghana, meaning that it cannot unambiguously be ranked above or below any other country, so it remains unconnected. Though variations exist, generally Hasse diagrams display the highest ranked object at the top and the lowest ranked at the bottom, and those where no clear ranking decision can be made are listed alongside each other. The partial order structure means that multiple linearizations of the partial ordering can be produced by extracting all the possible rankings of countries that fit the relationships described by the partial ordering (and hence, the Hasse diagram). From these, an average ranking can be obtained for each country to arrive at a single index to quantify relative differences between countries. Calculating all linearizations from 107 malaria endemic countries and the range of indicators considered is incredibly computationally intensive, thus an algorithm based on a local partial order model can be applied[59], and was used here to estimate average rankings.

Finally, the ranking of the objects is sensitive to the set of attributes. To quantify the importance of an attribute on ranking, posets obtained by different attribute sets are compared with each other. The approach outlined here enabled the sensitivities of the calculated relative technical, operational and overall feasibility posets to the removal and additions of the different indicators to be examined and quantified. The ranking result (Hasse diagram) by means of all factors was compared with the results when omitting step by step each single factor or pairs of factors. The greater the difference respectively, between the results, the greater is the influence of the omitted factor on the posets structure. This difference was measured using distance metrics outlined by Bruggemann *et al.*[60] and implemented using the software package ProRank (www.prorank.biz). In principle, a high value means a high influence of the factor on the ranking result. Omitting such a factor leads to significant changes of the Hasse diagram, whereas a zero value indicates no effect when omitting the factor in question.

3: Elimination feasibility factor sensitivity results

3.1 Introduction

The calculation of the partially ordered sets (posets) and average ranks are sensitive to the set of factors used. To quantify the importance of each factor on posets definition, we compared posets obtained from different sets of factors with each other. Comparing posets means that an appropriate metric must be found, by which the distance between any two posets can be calculated[61]. Here we use the approach outlined by Bruggemann[60] to calculate distances, and this is described in detail in the paper. The distances calculated serve as a guide to highlight important or less important factors and to identify any internal correlations among them. Relatively large values correspond to a relatively large distance between the poset constructed using all factors, and the poset constructed through the removal of an individual factor or pair of factors, equating to a relatively large effect on results. Relatively small values correspond to a relatively small distance, equating to a small effect on results.

In the following sections we present the sensitivity results in the form of tables of distance measures calculated to show the effects of the removal of one or a pair of factors on the overall poset definitions, and to highlight which factors have the biggest influence.

3.2 Technical feasibility

3.2.1 *P. falciparum*

Table S3.1 shows the sensitivity of factors in the relative *P. falciparum* technical feasibility partially ordered sets definition. As described above, the numbers represent the size of the effects of partially ordered set change caused by the removal of each factor (top row of values) or pair of factors (remaining rows). The similar numbers for the removal individually of R0 and imported malaria highlight, unsurprisingly, that each has an equal effect on set definitions.

	All factors	R_0	Imported malaria
All factors	0	1116	1114
R_0		0	2230
Imported malaria			0

Table S3.1. The sensitivity of factors in relative *P. falciparum* technical feasibility partially ordered sets definition.

3.3 Operational feasibility results

3.3.1 *P. falciparum*

Table S3.2 shows the sensitivity of factors in the relative *P. falciparum* operational feasibility partially ordered sets definition. As described in the introduction, the numbers represent the size of the effects of partially ordered set change caused by the removal of each factor (top row of values) or pair of factors (remaining rows). The largest effects are consistently caused by the removal of the accessibility factor, highlighting that this has the strongest influence on the resulting partially ordered set definitions and may thus be a constraining factor for more countries than any other factor listed. An example of this is Brazil, where all factors are relatively favorable for operational feasibility except for accessing those relatively remote populations at risk distributed throughout the Amazon basin.

	All factors	Political stability	Government effectiveness	Health expenditure	EPI	ANC	PAR	PAR Proportion	Access
All factors	0	120	34	17	86	75	128	79	227
Political stability		0	154	137	206	195	248	199	347
Government effectiveness			0	51	120	109	162	113	261
Health expenditure				0	103	92	145	96	244
EPI					0	161	214	165	313
ANC						0	203	154	302
PAR							0	207	355
PAR Proportion								0	306
Access									0

Table S3.2. Sensitivity of factors in relative *P. falciparum* operational feasibility partially ordered sets definition.

3.3.2 *P. vivax*

Table S3.3 shows the sensitivity of factors in the relative *P. vivax* operational feasibility partially ordered sets definition. As described in the introduction, the numbers represent the size of the effects of partially ordered set change caused by the removal of each factor (top row of values) or pair of factors (remaining rows). As above, the largest effects are consistently caused by the removal of the accessibility factor, highlighting that this has the strongest influence on the resulting partially ordered set definitions and may thus be a constraining factor for more countries than any other factor listed. Political stability was the factor with the second largest influence, emphasizing that many countries could substantially improve their relative positioning for *P. vivax* operational feasibility if a more stable situation arose.

	All factors	Political stability	Government effectiveness	Health expenditure	EPI	ANC	PAR	PAR Proportion	Access
All factors	0	124	68	89	118	39	70	34	189
Political stability		0	192	213	242	163	194	158	313
Government effectiveness			0	157	186	107	138	102	257
Health expenditure				0	207	128	159	123	278
EPI					0	157	188	152	307
ANC						0	109	73	228
PAR							0	104	259
PAR Proportion								0	223
Access									0

Table S3.3. Sensitivity of factors in relative *P. vivax* operational feasibility partially ordered sets definition.

3.4 Overall feasibility results

3.4.1 *P. falciparum*

Table S3.4 shows the sensitivity of factors in the relative *P. falciparum* overall elimination feasibility partially ordered sets definition. As described in the introduction, the numbers represent the size of the effects of partially ordered set change caused by the removal of each factor (top row of values) or pair of factors (remaining rows). Again, the largest effects are consistently caused by the removal of the accessibility factor, highlighting that this has the strongest influence on the resulting partially ordered set definitions and may thus be a constraining factor for more countries than any other factor listed. Here, imported malaria showed the second largest influence, highlighting that for many countries, such as South Africa or Thailand particularly, proximity to neighbouring higher transmission countries and the levels of cross border movement from these countries, are an obstacle to *P. falciparum* elimination at present.

	All factors	R_0	Imported malaria	Political stability	Government effectiveness	Health expenditure	EPI	ANC	PAR	PAR Proportion	Access
All factors	0	5	88	79	27	8	52	57	54	18	168
R_0		0	93	84	32	13	57	62	59	23	173
Imported malaria			0	167	115	96	140	145	142	106	256
Political stability				0	106	87	131	136	133	97	247
Government effectiveness					0	35	79	84	81	45	195
Health expenditure						0	60	65	62	26	176
EPI							0	109	106	70	220
ANC								0	111	75	225
PAR									0	72	222
PAR Proportion										0	186
Access											0

Table S3.4. The sensitivity of factors in relative overall *P. falciparum* elimination feasibility partially ordered sets definition.

4: Table of all elimination feasibility indicator values

The table presented on the next 12 pages shows the indicator values used in the study for all malaria endemic countries.

Country Code	*Pf*	*Pv*	Country	*Pf*R0	Imported *Pf*	Political Stability	Govt Effectiveness	Health expenditure
AFG	1	1	Afghanistan	0.681585	1955.91931	-2.635791668	-1.309462386	26
AGO	1	1	Angola	44.858137	9569.40519	-0.430451949	-0.98194958	41
ARG		1	Argentina			-0.038469612	-0.180516692	1529
AZE		1	Azerbaijan			-0.482711247	-0.637622543	193
BDI	1	1	Burundi	16.439306	19032.92041	-1.42612575	-1.214319085	17
BEN	1	1	Benin	58.232178	58019.32613	0.345163534	-0.518131029	46
BFA	1	1	Burkina Faso	85.968713	430338.5955	-0.107732898	-0.667023724	86
BGD	1	1	Bangladesh	2.657566	48015.27438	-1.543455849	-0.768674944	57
BLZ	1	1	Belize	0.000961	105.99512	0.25059551	-0.416985082	377
BOL	1	1	Bolivia	0.024852	97.63424	-1.023044612	-0.807425794	203
BRA	1	1	Brazil	0.461786	4097.5889	-0.119403571	-0.009818661	755
BTN	1	1	Bhutan	1.970842	248.59944	0.885333498	0.113885017	85
BWA	1	1	Botswana	1.489574	14356.83932	0.955863623	0.668226272	726
CAF	1	1	Central African Republic	48.254743	18630.28659	-1.773954708	-1.450083118	54
CHN	1	1	China	0.029559	7826.22897	-0.317012514	0.236616101	315
CIV	1	1	Côte d'Ivoire	92.356859	1136101.817	-1.908030862	-1.387901459	63
CMR	1	1	Cameroon	45.203112	69857.34482	-0.533737655	-0.799164448	78
COD	1	1	Democratic Republic of the Congo	46.900086	73843.99319	-2.339163839	-1.893133921	17
COG	1	1	Congo	61.555022	72803.40022	-0.609209429	-1.337780651	26
COL	1	1	Colombia	0.168709	130.28943	-1.662871124	0.129732769	581
COM	1	1	Comoros	6.442374	2157.63774	-1.011746664	-1.878626684	32
CPV	1		Cape Verde			0.852514966	0.052149088	258
CRI		1	Costa Rica			0.558659555	0.392057829	684
DJI	1	1	Djibouti	0.180919	9372.19556	-0.125848514	-0.981561095	97
DOM	1		Dominican Republic	0.190204	3289.45112	0.098948716	-0.395324981	356
ECU	1	1	Ecuador	0.401824	189.68127	-0.832168237	-0.973833544	274
ERI	1	1	Eritrea	1.458421	4210.8262	-0.835320777	-1.409160307	24
ETH	1	1	Ethiopia	2.155496	70765.30253	-1.789406437	-0.427570999	20
GAB	1	1	Gabon	42.136189	104767.8229	0.229990316	-0.704384393	274
GEO		1	Georgia			-0.998073186	0.184484658	318
GHA	1	1	Ghana	59.251518	183717.8579	0.059579966	-0.07546621	93
GIN	1	1	Guinea	47.978106	303802.6055	-1.912235485	-1.389342902	110

Country Code	Pf	Pv	Country	*Pf*R0	Imported *Pf*	Political Stability	Govt Effectiveness	Health expenditure
GMB	1	1	Gambia	11.908908	53927.15638	0.144422112	-0.766949232	64
GNB	1	1	Guinea-Bissau	20.438206	5615.443	-0.377589051	-1.256962626	32
GNQ	1	1	Equatorial Guinea	79.806361	411.32268	-0.085661295	-1.4342393	282
GTM	1	1	Guatemala	0.125791	48.7309	-0.583549216	-0.491829412	244
GUF	1	1	French Guiana	0.845511	1672.26302	0.078576816	0.757667745	325
GUY	1	1	Guyana	0.211771	0.96044	-0.563992718	-0.172590783	238
HND	1	1	Honduras	0.143846	70.99748	-0.358743459	-0.57397803	226
HTI	1		Haiti	1.163089	165.38244	-1.385523958	-1.291994856	71
IDN	1	1	Indonesia	1.323816	14294.11226	-1.002120969	-0.29087066	78
IND	1	1	India	2.879722	125911.9497	-0.993647276	-0.027717627	100
IRN	1	1	Iran	0.048973	16925.28979	-1.055237042	-0.748215009	677
IRQ		1	Iraq			-2.690858897	-1.405319998	130
KEN	1	1	Kenya	3.091541	74659.51967	-1.249556813	-0.604953547	95
KGZ		1	Kyrgyzstan			-0.683279693	-0.700948737	113
KHM	1	1	Cambodia	4.213678	4459.00859	-0.27050479	-0.805060649	167
KOR		1	Republic of Korea			0.407663406	1.258755013	1263
LAO	1	1	Lao People's Democratic Republic	6.596801	321.55101	-0.011332709	-0.84475968	78
LBR	1	1	Liberia	81.377688	70765.30253	-0.987748108	-1.361306712	41
LKA	1	1	Sri Lanka	0.350128	17640.92002	-2.043577913	-0.292551487	189
MDG	1	1	Madagascar	28.874875	2040.10689	-0.415388211	-0.587473417	33
MEX		1	Mexico			-0.624398915	0.175999383	725
MLI	1	1	Mali	57.118123	23091.5001	-0.21029196	-0.780202808	60
MMR	1	1	Myanmar	18.894181	2239.70427	-1.561592752	-1.675759401	38
MOZ	1	1	Mozambique	34.367728	16470.40937	0.292326241	-0.384141164	47
MRT	1	1	Mauritania	7.750881	16465.64333	-0.926093799	-0.97384625	49
MUS			Mauritius			0.837320762	0.603815709	544
MWI	1	1	Malawi	32.754414	80651.55659	0.050538409	-0.648374759	64
MYS	1	1	Malaysia	1.918419	47223.29002	0.129977107	1.127929998	454
MYT	1		Mayotte	0.000000				
NAM	1	1	Namibia	4.485841	34707.54054	0.955540445	0.312186031	344
NER	1	1	Niger	31.975677	58027.13572	-0.747033371	-0.792660989	25
NGA	1	1	Nigeria	55.410860	285731.3199	-2.008863946	-0.984467989	45

Country Code	Pf	Pv	Country	*Pf*R0	Imported *Pf*	Political Stability	Govt Effectiveness	Health expenditure
NIC	1	1	Nicaragua	0.320263	80.88996	-0.386266022	-0.963271052	253
NPL	1	1	Nepal	0.161158	18893.05464	-1.689395281	-0.753165661	76
PAK	1	1	Pakistan	0.683911	125682.8316	-2.613753628	-0.727844591	49
PAN	1	1	Panama	0.479237	279.1029	0.107710546	0.164527679	660
PER	1	1	Peru	0.178325	152.91426	-0.839011464	-0.30371013	274
PHL	1	1	Philippines	1.832653	29554.95431	-1.413434291	0.000580731	199
PNG	1	1	Papua New Guinea	9.925573	60.69294	-0.553835913	-0.798010399	172
PRK		1	Korea, Dem People's Rep			0.353497936	-2.120668478	47
PRY		1	Paraguay			-0.626406534	-0.776638066	312
RWA	1	1	Rwanda	14.323959	40388.79143	-0.135297592	-0.198883094	136
SAU	1	1	Saudi Arabia	0.094191	135043.9881	-0.389500903	0.00916202	570
SDN	1	1	Sudan	4.953571	307950.7443	-2.443339415	-1.408917829	54
SEN	1	1	Senegal	10.427626	78131.95836	-0.156036529	-0.123424702	69
SLB	1	1	Solomon Islands	16.737324	124.05546	0.118217069	-0.789374087	92
SLE	1	1	Sierra Leone	59.486672	28235.38001	-0.234844808	-1.125299546	41
SLV		1	El Salvador			0.094547181	-0.151763447	364
SOM	1	1	Somalia	5.163945	6779.18561	-3.276939943	-2.510755951	0
STP	1	1	Sao Tome and Principe	25.198464	2026.16534	0.289764934	-0.736686671	122
SUR	1	1	Suriname	0.067298	13.58676	0.152203512	0.00342623	325
SWZ	1	1	Swaziland	1.608025	13026.17879	0.220334988	-0.6597282	360
TCD	1	1	Chad	16.332055	16021.20658	-1.924762099	-1.477655882	41
TGO	1	1	Togo	74.258134	72803.40022	-0.097073049	-1.434602494	67
THA	1	1	Thailand	1.650042	32901.31374	-1.187670262	0.109770062	323
TJK	1	1	Tajikistan	0.063261	531.91387	-0.744789096	-0.883360956	67
TLS	1	1	Timor-Leste	9.298403	124.41627	-1.130483718	-0.99846957	145
TUR		1	Turkey			-0.733271445	0.203609952	592
TZA	1	1	United Republic of Tanzania	18.835812	222747.1637	0.006460992	-0.451389434	40
UGA	1	1	Uganda	25.792174	100341.3536	-0.87687564	-0.510901547	130
UZB		1	Uzbekistan			-0.911438135	-0.682811824	171
VEN	1	1	Venezuela	0.009789	3364.2073	-1.233565655	-0.850294286	325
VNM	1	1	Viet Nam	0.728952	943.52415	0.315577351	-0.313484928	221
VUT	1	1	Vanuatu	2.625414	6.54881	1.296103989	-0.355489518	133

Country Code	Pf	Pv	Country	*Pf*R0	Imported *Pf*	Political Stability	Govt Effectiveness	Health expenditure
YEM	1	1	Yemen	3.271805	5409.76868	-1.88673601	-0.993462897	88
ZAF	1	1	South Africa	0.706834	220011.3473	-0.044336154	0.750948458	811
ZMB	1	1	Zambia	17.171396	110059.7567	0.287987009	-0.662786999	62
ZWE	1	1	Zimbabwe	1.400701	140511.2236	-1.563308101	-1.555597897	146

(continued on next page)

Country Code	Pf	Pv	Country	*Pf* PAR	*Pf* PAR Proportion	*Pf* Access	*Pv* PAR	*Pv* PAR Proportion	*Pv* Access
AFG	1	1	Afghanistan	4578492	16.1053091	281.09942	23911779.690	80.97134711	232.87734
AGO	1	1	Angola	15471742	96.32197927	392.84034	812425.000	5.112914589	499.84596
ARG		1	Argentina						157.39033
AZE		1	Azerbaijan				22227.870	0.273052682	91.41809
BDI	1	1	Burundi	5724247	70.69478215	238.16856	144279.460	1.79402372	235.63228
BEN	1	1	Benin	7829101	100	139.94475	239123.900	3.067990642	163.01521
BFA	1	1	Burkina Faso	14254862	99.99955103	187.86382	289497.510	2.024910106	195.85537
BGD	1	1	Bangladesh	15411613	9.888483948	109.21602	30920746.880	20.41326521	147.71609
BLZ	1	1	Belize	0	1.396972674	309.54215	145320.640	56.84306624	498.24683
BOL	1	1	Bolivia	219810	2.307585227	293.13753	947076.760	9.931695607	749.19453
BRA	1	1	Brazil	13087858	6.983595017	148.49063	12958962.500	7.122598942	1173.12593
BTN	1	1	Bhutan	806871	33.55579907	907.48689	1407477.440	56.29467284	902.65369
BWA	1	1	Botswana	892230	53.2046653	310.56303	228416.060	14.87236587	519.37809
CAF	1	1	Central African Republic	4171345	100	314.61482	130912.210	3.42098232	420.01066
CHN	1	1	China	17997744	1.355876722	189.76217	66976118.750	5.070144	218.05404
CIV	1	1	Côte d'Ivoire	18116549	99.99980129	157.92921	508511.870	2.925727888	198.11651
CMR	1	1	Cameroon	17070699	98.22981809	154.45243	1181.670	0.007059271	206.75936
COD	1	1	Democratic Republic of the Congo	59049982	93.822845	336.27864	1934110.160	3.106141639	388.79423
COG	1	1	Congo	3577038	99.99865813	245.34659	35016.560	0.912519792	461.82400
COL	1	1	Colombia	5315435	11.41501853	131.57279	7132164.840	15.34879974	343.37619
COM	1	1	Comoros	644720	97.21805452	109.21602	4456.640	0.771505233	109.21602
CPV	1		Cape Verde						
CRI		1	Costa Rica				90156.070	1.99232911	314.22106
DJI	1	1	Djibouti	22258	3.086668858	81.18879	139717.420	20.37946478	196.88108
DOM	1		Dominican Republic	1427460	15.28827534	72.37563			
ECU	1	1	Ecuador	4208623	30.56906111	142.05042	2924000.390	21.33143279	294.68488
ERI	1	1	Eritrea	3344899	68.90195193	308.57453	2609500.200	54.44634209	333.71870
ETH	1	1	Ethiopia	46202873	61.40745862	437.41046	20536829.690	27.57912656	454.64048
GAB	1	1	Gabon	1385410	100	365.28476	6523.370	0.496120122	896.90527
GEO		1	Georgia						
GHA	1	1	Ghana	22470098	100	149.02996	657388.130	2.960788748	162.41522
GIN	1	1	Guinea	9338940	100	154.03620	207019.920	2.201062022	202.35752

Country Code	Pf	Pv	Country	*Pf* PAR	*Pf* PAR Proportion	*Pf* Access	*Pv* PAR	*Pv* PAR Proportion	*Pv* Access
GMB	1	1	Gambia	1599387	100	102.63324	1017.990	0.074639771	176.07780
GNB	1	1	Guinea-Bissau	1483890	99.9706264	185.51464	17230.700	1.239772116	204.38852
GNQ	1	1	Equatorial Guinea	533421	99.28822046	205.12924			300.51755
GTM	1	1	Guatemala	1025095	7.597259815	155.90872	5092343.750	37.88522289	243.32927
GUF	1	1	French Guiana	141925	70.91817614	537.43876	28946.880	15.03801404	1395.59902
GUY	1	1	Guyana	140370	18.41739267	850.76206	526913.530	69.99750568	793.52432
HND	1	1	Honduras	917228	12.47554306	131.74863	2639436.720	35.69564591	205.33798
HTI	1		Haiti	8898016	97.6533068	127.33539			
IDN	1	1	Indonesia	70748324	30.52919191	176.13591	44480066.000	19.86701714	448.39920
IND	1	1	India	406445907	36.69848085	104.98910	657109600.000	59.43960088	125.57593
IRN	1	1	Iran	0	0.188834155	110.47660	3679312.500	4.872744239	274.63837
IRQ		1	Iraq				65261.040	0.236237212	194.21883
KEN	1	1	Kenya	25935079	70.42192748	190.60175	816897.800	2.29075448	197.85084
KGZ		1	Kyrgyzstan			126.96278			
KHM	1	1	Cambodia	10871081	73.39585246	158.36269	10228581.250	70.76920152	179.23354
KOR		1	Republic of Korea				1793983.010	3.980138985	36.86871
LAO	1	1	Lao People's Democratic Republic	5283739	89.07011533	401.23774	1598007.710	25.62783416	330.41403
LBR	1	1	Liberia	3572185	100	344.09629	114583.850	3.557974553	392.12667
LKA	1	1	Sri Lanka	1903693	9.754570976	126.28240	4107034.770	21.20428788	125.78214
MDG	1	1	Madagascar	17526895	90.33437991	294.19819	2404056.640	12.5999304	309.15094
MEX		1	Mexico				2180962.300	2.026630195	360.25120
MLI	1	1	Mali	13561195	96.66567039	221.81451	293577.320	2.096440724	260.43617
MMR	1	1	Myanmar	50620169	99.65003505	268.85568	48252481.250	95.82869556	314.83329
MOZ	1	1	Mozambique	21482432	99.92670081	316.28653	404704.910	1.973271443	358.01317
MRT	1	1	Mauritania	939004	66.30695825	333.27651	21137.820	1.459897919	404.63409
MUS			Mauritius						
MWI	1	1	Malawi	13505676	99.98897622	252.79088	180580.920	1.374193556	253.45305
MYS	1	1	Malaysia	6424354	25.40120342	157.84544	5711705.860	23.85738406	556.18367
MYT	1		Mayotte						
NAM	1	1	Namibia	1251221	64.63719676	635.07548	434038.330	24.14480654	786.66927
NER	1	1	Niger	13232645	95.53529284	195.30831	91891.770	0.672272291	266.75877
NGA	1	1	Nigeria	134996361	99.99989778	130.86182	455056.640	0.347172506	152.90932

Country Code	Pf	Pv	Country	*Pf* PAR	*Pf* PAR Proportion	*Pf* Access	*Pv* PAR	*Pv* PAR Proportion	*Pv* Access
NIC	1	1	Nicaragua	1577460	28.34406961	121.31346	2726328.130	47.14026318	241.58944
NPL	1	1	Nepal	3416113	12.83822734	295.23773	8440474.220	30.34703706	214.69673
PAK	1	1	Pakistan	31222894	19.45894222	135.25143	54385618.750	32.61906995	196.70986
PAN	1	1	Panama	0	28.13001072	138.54100	474231.640	15.15582509	381.33743
PER	1	1	Peru	3863558	13.90584958	362.09978	4278798.830	15.36726925	1044.96337
PHL	1	1	Philippines	27444087	31.62657504	142.23462	20893443.750	26.25015284	249.44382
PNG	1	1	Papua New Guinea	4232031	74.96077076	1419.98196	3886703.520	72.5909914	1490.56106
PRK		1	Korea, Dem People's Rep				97050.540	0.435575333	148.97690
PRY		1	Paraguay				818887.110	12.77911424	183.40443
RWA	1	1	Rwanda	5141675	56.61357001	250.96123	180871.810	1.97077621	217.33964
SAU	1	1	Saudi Arabia	0	3.035965419	120.48721			
SDN	1	1	Sudan	29079353	80.87998773	252.58553	10152260.940	28.44972313	340.48315
SEN	1	1	Senegal	11265479	100	94.00151	10427.070	0.101404877	149.45311
SLB	1	1	Solomon Islands	508701	95.46347643	884.70886	243478.080	54.92650246	938.56944
SLE	1	1	Sierra Leone	5670712	100	113.74630	144569.070	2.655612412	138.15052
SLV		1	El Salvador				112235.030	1.598804974	165.73914
SOM	1	1	Somalia	10258941	94.87879971	394.90380	1976093.750	18.29275885	431.12034
STP	1	1	Sao Tome and Principe	149293	96.37713437	148.11955	323.940	0.214434854	144.26922
SUR	1	1	Suriname	6913	1.57681289	300.49473			2460.09198
SWZ	1	1	Swaziland	227630	22.87959441	223.87568	20323.440	2.131191038	268.10282
TCD	1	1	Chad	9813442	98.36853712	314.84869	182846.570	1.845107276	407.41701
TGO	1	1	Togo	5502409	100	157.36348	130549.020	2.444356443	181.33302
THA	1	1	Thailand	16907768	25.66064548	179.01713	17754465.630	26.96915813	261.83927
TJK	1	1	Tajikistan	0	0.085005942	342.94273	1757688.480	26.59074827	168.73300
TLS	1	1	Timor-Leste	760390	96.27383454	104.98910	698636.000	61.82619469	104.98910
TUR		1	Turkey				256958.280	0.356178536	128.27783
TZA	1	1	United Republic of Tanzania	40343251	96.20254713	286.09152	776147.900	1.965045813	413.48691
UGA	1	1	Uganda	27213547	93.51422007	164.02836	913861.130	3.056679824	160.02415
UZB		1	Uzbekistan				118365.060	0.435643877	171.89514
VEN	1	1	Venezuela	220937	0.806939644	73.23032	4417213.280	16.48054762	371.52062
VNM	1	1	Viet Nam	21113749	24.48770972	125.14153	7289245.310	8.871314348	277.39359
VUT	1	1	Vanuatu	234188	99.95049167	72.37563	149591.330	79.51356509	72.37563

Country Code	Pf	Pv	Country	*Pf* PAR	*Pf* PAR Proportion	*Pf* Access	*Pv* PAR	*Pv* PAR Proportion	*Pv* Access
YEM	1	1	Yemen	15778849	69.84204852	384.93389			
ZAF	1	1	South Africa	0	7.40018838	143.30376	207797.710	0.464306025	340.76852
ZMB	1	1	Zambia	11901907	99.9945978	387.67671	1040306.050	8.831592536	437.29116
ZWE	1	1	Zimbabwe	7405711	55.52679636	192.18034	413699.800	3.140620219	278.21260

(continued on next page)

Country Code	Pf	Pv	Country	ANC	EPI
AFG	1	1	Afghanistan	16.10000	81.66667
AGO	1	1	Angola	79.80000	78.33333
ARG		1	Argentina	99.20000	96.33333
AZE		1	Azerbaijan	76.60000	69.66667
BDI	1	1	Burundi	92.40000	88.33333
BEN	1	1	Benin	84.10000	64.00000
BFA	1	1	Burkina Faso	85.00000	77.66667
BGD	1	1	Bangladesh	51.20000	93.00000
BLZ	1	1	Belize	94.00000	94.66667
BOL	1	1	Bolivia	77.20000	83.66667
BRA	1	1	Brazil	97.80000	98.33333
BTN	1	1	Bhutan	88.00000	97.00000
BWA	1	1	Botswana	96.80000	95.33333
CAF	1	1	Central African Republic	69.30000	54.33333
CHN	1	1	China	90.90000	96.66667
CIV	1	1	Côte d'Ivoire	84.80000	65.00000
CMR	1	1	Cameroon	81.90000	82.00000
COD	1	1	Democratic Republic of the Congo	85.30000	68.00000
COG	1	1	Congo	85.80000	85.66667
COL	1	1	Colombia	93.50000	92.00000
COM	1	1	Comoros	75.00000	79.33333
CPV	1		Cape Verde	97.60000	96.00000
CRI		1	Costa Rica	89.93000	90.00000
DJI	1	1	Djibouti	92.30000	83.66667
DOM	1		Dominican Republic	98.90000	80.00000
ECU	1	1	Ecuador	84.20000	71.00000
ERI	1	1	Eritrea	70.30000	96.00000
ETH	1	1	Ethiopia	27.60000	76.66667
GAB	1	1	Gabon	94.40000	41.33333
GEO		1	Georgia	94.30000	92.66667
GHA	1	1	Ghana	96.10000	86.33333
GIN	1	1	Guinea	88.40000	67.00000

Country Code	Pf	Pv	Country	ANC	EPI
GMB	1	1	Gambia	97.80000	94.66667
GNB	1	1	Guinea-Bissau	77.90000	67.66667
GNQ	1	1	Equatorial Guinea	86.10000	41.00000
GTM	1	1	Guatemala	84.30000	88.66667
GUF	1	1	French Guiana	89.90000	68.00000
GUY	1	1	Guyana	81.40000	93.66667
HND	1	1	Honduras	91.70000	93.66667
HTI	1		Haiti	84.50000	54.33333
IDN	1	1	Indonesia	93.30000	79.00000
IND	1	1	India	74.20000	67.66667
IRN	1	1	Iran	98.30000	98.66667
IRQ		1	Iraq	83.80000	65.66667
KEN	1	1	Kenya	88.10000	86.66667
KGZ		1	Kyrgyzstan	96.90000	96.33333
KHM	1	1	Cambodia	69.30000	90.33333
KOR		1	Republic of Korea	100.00000	92.66667
LAO	1	1	Lao People's Democratic Republic	35.10000	57.66667
LBR	1	1	Liberia	79.30000	66.66667
LKA	1	1	Sri Lanka	99.40000	98.00000
MDG	1	1	Madagascar	79.90000	90.33333
MEX		1	Mexico	94.20000	83.33333
MLI	1	1	Mali	70.40000	74.00000
MMR	1	1	Myanmar	75.60000	79.66667
MOZ	1	1	Mozambique	89.10000	84.00000
MRT	1	1	Mauritania	75.40000	98.66667
MUS			Mauritius		97.33333
MWI	1	1	Malawi	91.90000	91.66667
MYS	1	1	Malaysia	78.80000	97.66667
MYT	1		Mayotte		
NAM	1	1	Namibia	94.60000	99.00000
NER	1	1	Niger	46.40000	59.00000
NGA	1	1	Nigeria	57.70000	99.00000

Country Code	Pf	Pv	Country	ANC	EPI
NIC	1	1	Nicaragua	90.20000	70.00000
NPL	1	1	Nepal	43.70000	96.33333
PAK	1	1	Pakistan	60.90000	93.66667
PAN	1	1	Panama	72.20000	83.00000
PER	1	1	Peru	91.00000	95.66667
PHL	1	1	Philippines	91.00000	91.33333
PNG	1	1	Papua New Guinea	78.80000	57.00000
PRK		1	Korea, Dem People's Rep	95.00000	96.00000
PRY		1	Paraguay	96.30000	76.33333
RWA	1	1	Rwanda	95.80000	95.33333
SAU	1	1	Saudi Arabia	90.00000	97.66667
SDN	1	1	Sudan	63.70000	83.33333
SEN	1	1	Senegal	87.40000	84.00000
SLB	1	1	Solomon Islands	73.90000	72.00000
SLE	1	1	Sierra Leone	81.10000	56.66667
SLV		1	El Salvador	94.00000	94.33333
SOM	1	1	Somalia	26.10000	26.33333
STP	1	1	Sao Tome and Principe	97.30000	97.00000
SUR	1	1	Suriname	89.90000	85.00000
SWZ	1	1	Swaziland	84.80000	95.00000
TCD	1	1	Chad	38.90000	26.33333
TGO	1	1	Togo	84.10000	84.66667
THA	1	1	Thailand	97.80000	98.66667
TJK	1	1	Tajikistan	88.80000	86.33333
TLS	1	1	Timor-Leste	60.50000	77.00000
TUR		1	Turkey	92.00000	96.33333
TZA	1	1	United Republic of Tanzania	75.80000	87.00000
UGA	1	1	Uganda	93.50000	63.66667
UZB		1	Uzbekistan	99.00000	98.00000
VEN	1	1	Venezuela	94.10000	66.00000
VNM	1	1	Viet Nam	90.80000	92.66667
VUT	1	1	Vanuatu	84.30000	72.33333

Country Code	Pf	Pv	Country	ANC	EPI
YEM	1	1	Yemen	47.00000	66.00000
ZAF	1	1	South Africa	91.90000	64.66667
ZMB	1	1	Zambia	93.70000	80.66667
ZWE	1	1	Zimbabwe	94.20000	64.66667

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