Malaria parasite species

Confirmation of the diagnosis of malaria by microscopy provides an additional critical advantage, identification of parasite species. Some dipstick diagnostics can also achieve this. Clearly severity of illness, mortality liability, and optimal drug therapy depend on parasite species recognition whereas clinical diagnosis alone can only provide an intelligent surmise in making the decision between malaria and other causes of fever, or the appropriate antimalarial therapeutic drug selection, without knowledge of the parasite species.

Utilizing the database giving confirmed malaria case incidence, it is also possible to map relative parasite species distribution by unit area and by country. Figure 17(a,b,c,d) provides an example of such information. While absolute species numbers per unit area form the underlying database, the *Plasmodium falciparum:Plasmodium vivax (Pf:Pv)* ratio is plotted directly here, since overall incidence data are already given in preceding maps. Blue color reflects *Pf* dominance in a given area and by difference green color reflects greater *Pv* incidence. Four years' data (1998 - 2001) are shown to provide a picture of the modest changes in species ratio that do indeed occur. Careful judgment is required in interpreting these maps since it is the relative frequency of species rather than the absolute incidence that is displayed. Thus China/Yunnan shows predominance of *Pv* although total *Pv* incidence is low.

While a similar overall species pattern is recognizable in the samples recorded 4 years apart, careful attention to detail shows that in some unit areas there is a shift in ratio or indeed a switch from majority *Pf* or *Pv* to the contrary species. This tends to happen in proximity to international borders where human and vector population mobility is substantial (Konchom *et al*, 2003) but may be multifactorial, influenced perhaps by drug availability for example. If this trend is continued or intensified it will impact on antimalarial drug policy. This is a potentially critical outcome of the regional data analysis and program management consultations that have been in progress already for several years. Micro-mapping is required for further analysis in border areas and within each administrative area to ascertain whether local conditions favor transmission of either species, including trans-border movement of parasites, hosts or vectors.

Technical factors may also play a role in the differential species preference: thus in mixed infections *Pv* may initially be masked and emerge in a patient after treatment of a *Pf* infection. *Pv* density on a microscope slide examination may be low enough to be missed by the microscopist, while the severity of symptoms of *Pf* infection may result in more frequent diagnosis of that species (reporting bias). It is also important to note that China/Yunnan and Thailand routinely report only laboratory-confirmed cases while

Cambodia, Lao PDR, Viet Nam rely to a greater or lesser extent on clinical diagnosis with partial coverage by microscopic and/or dipstick diagnosis. Dipsticks are usually available for the detection of falciparum malaria only. Because of the differential diagnostic facilities in different countries or parts thereof, the interpretation of relative species prevalence may not be uniform. Thus the more severe cases are more likely to be hospitalized where definitive diagnostic capacity exists, so the species diagnosed is more likely to be *Pf* than *Pv.* In areas where the proportion of confirmed cases is low more *Pf* are likely to be reported.

It is not possible currently to give a definitive explanation of the differential species distribution but it is apparent that these intriguing observations can stimulate research questions pertinent to future control program management. This is a matter that can best be investigated on a collaborative basis across borders since there are important implications for drug policy.

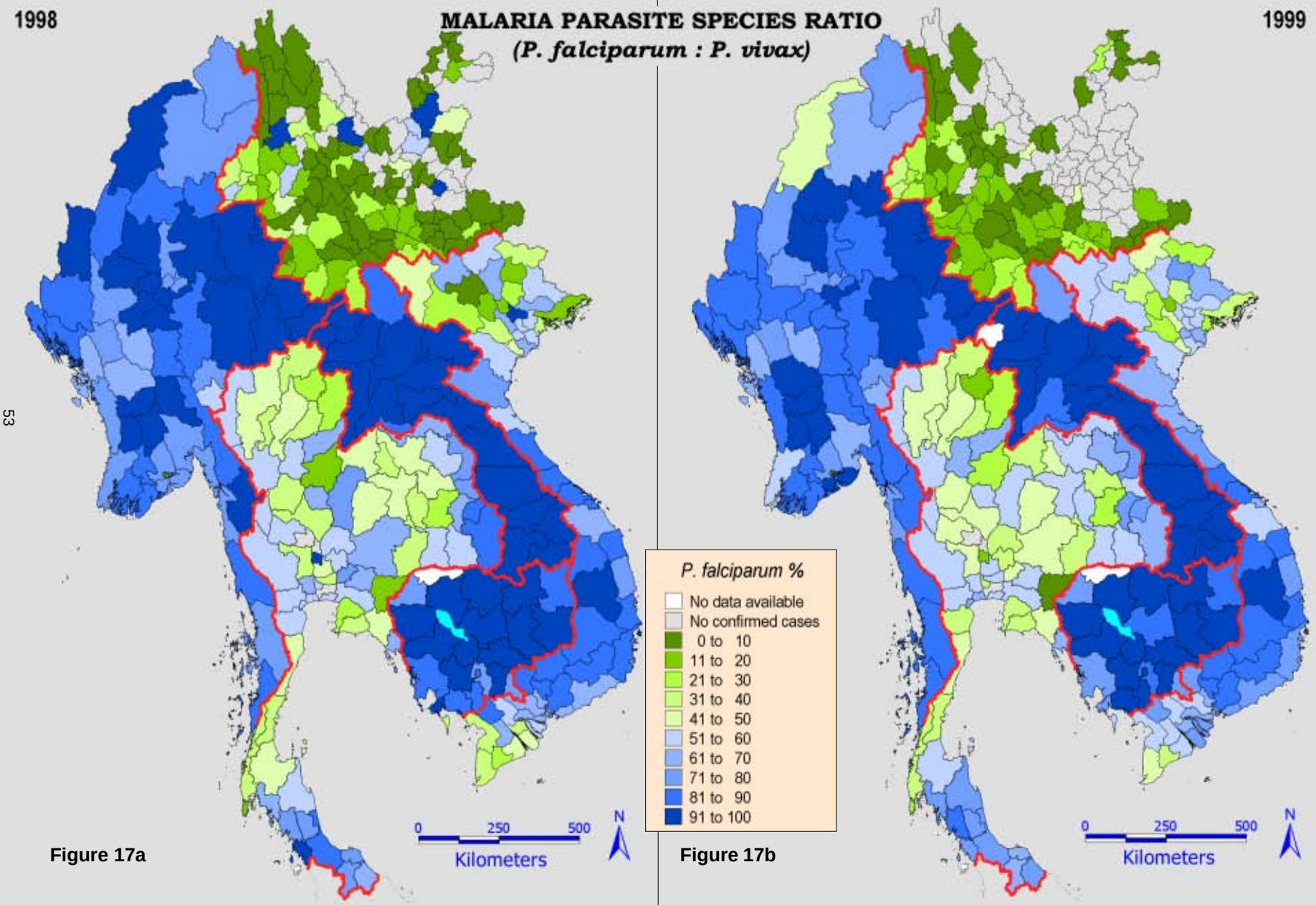

Figure 17a

Figure 17b

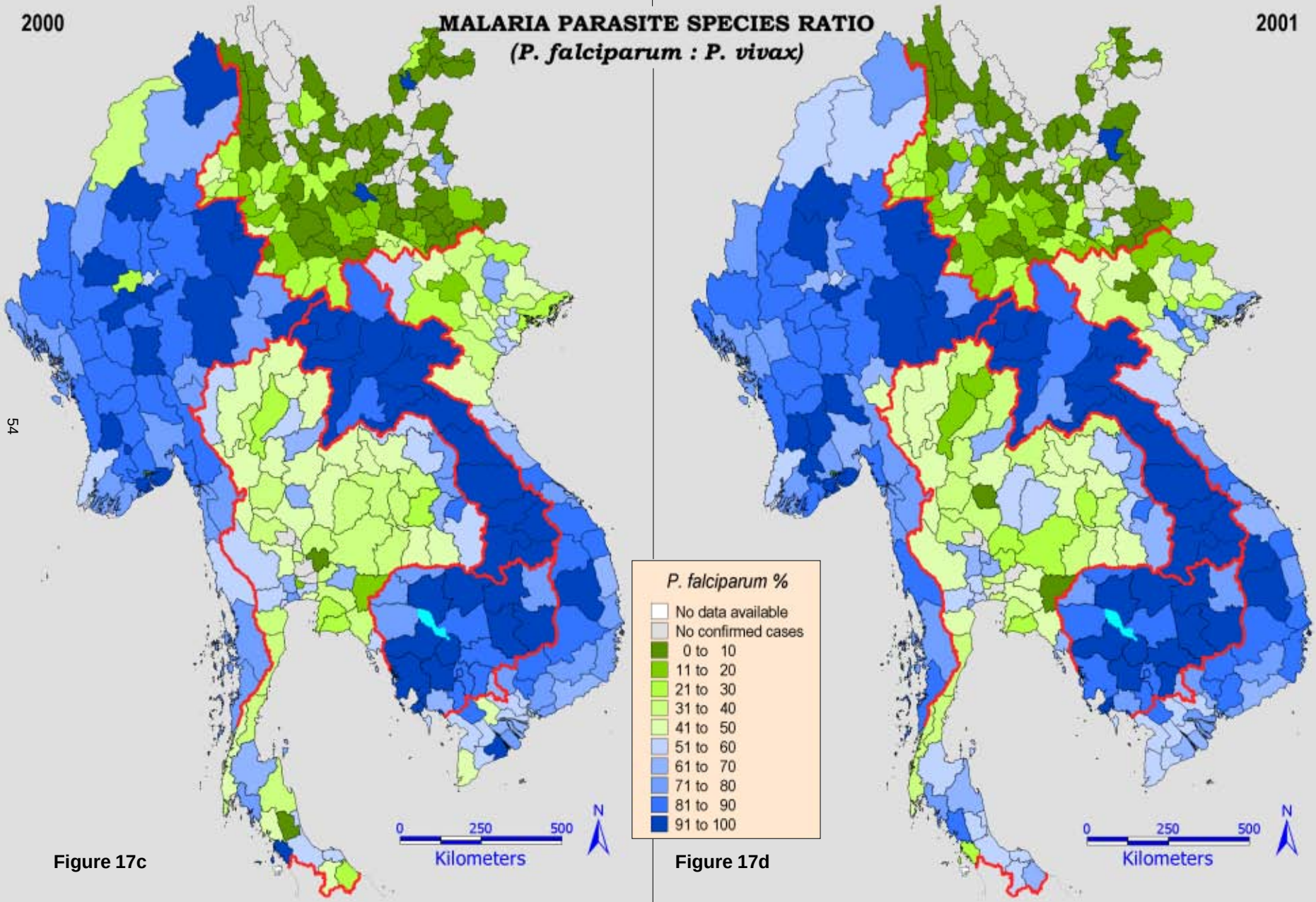

Figure 17c

Figure 17d