LEGENDS FOR SUPPLEMENT FIGURES

Figure S1: Outcomes for single-species P. vivax infection as a function of the basic reproduction rate $R_0$ assuming $\tau_{\text{ret}} = 14$ days instead of 1.5 days. (That is, the stage of vulnerability of young RBCs to infection has duration 14 days instead of 1.5 days.) $p = 16$. (A) time of onset to catastrophic anemia vs. $R_0$. Data points on the top “plateau” show where host survival exceeded the simulated duration of infection (~833 days). (B) peak counts of infected RBCs, $I_{PK}$, vs. $R_0$. (C) counts of infected RBCs integrated over the course of the infection, $I_{INT}$, vs. $R_0$. In each panel, the simulated data points are labeled as follows: (o) RBC production fixed at the basal rate, ($\triangle$) compensatory response in RBC production, up to 2X the basal rate, ($\triangledown$) diserythropoietic response in RBC production, down to 0.8X the basal rate.

Figure S2: Integrated parasitemia $I_{INT}$ varying with basic reproduction rates $R_{0V}$ and $R_{0F}$ and relative inoculation time $\Delta ST$. RBC production is fixed at the basal rate. Contours for $I_{INT}$ for both P. vivax and P. falciparum are spaced $2.5*10^5 \mu l^{-1}$ apart. (A) $\Delta ST = + 10$ weeks. (B) $\Delta ST = 0$. (C) $\Delta ST = -10$ weeks. The gray shading from dark gray to white is to guide the eye from lowest to maximum values. The darkest gray shows values between 0 and the first contour. Black shading is where the host dies before the second infection begins. For both P. vivax and P. falciparum, $p = 16$, and the stage of vulnerability to P. vivax is 1.5 days.

Figure S3: Time series of parasitemia, RBC production rate, and RBC count for an
example in \((R_{0F}, R_{0V})\) space that illustrate mutual suppression of both species in mixed \(P. \text{vivax}-P. \text{falciparum}\) infection. All series are plotted against \(T_{INC}\), the time since the host was inoculated with the initial infecting species. \(R_{0F} = 1.741, R_{0V} = 1.741\). RBC production rate is fixed at the basal rate. The maximum parasitemia for \(P. \text{vivax}\) is 5% lower than in the corresponding single spp. infection, and the maximum parasitemia for \(P. \text{falciparum}\) is 28% lower than in the corresponding single spp. infection. (A) Count of RBCs infected with \(P. \text{vivax}\) vs. \(T_{INC}\). (B): Count of RBCs infected with \(P. \text{falciparum}\) vs. \(T_{INC}\). (C): Ratio of reticulocyte count to basal reticulocyte count vs. \(T_{INC}\). (D): Ratio of RBC count to bas al RBC count vs. \(T_{INC}\). Black curve shows plot for dual species infection; dotted curve shows plot for \(P. \text{vivax}\)- only infection with \(R_{0V} = 1.741\), and gray curves shows plot for \(P. \text{falciparum}\)- only infection with \(R_{0F} = 1.741\). When the curve for the dual infection overlaps with a curve for a monospecies infection, only the one for dual infection is shown. Symbol "x" marks time of death of host.

**Figure S4:** Integrated \(P. \text{vivax}\) parasitemia, \(I_{INT}\), varying with basic reproduction rates \(R_{0V}\) and \(R_{0F}\) and relative inoculation time \(\Delta ST\), with a compensatory RBC source. Contours for \(I_{INT}\) for both \(P. \text{vivax}\) and \(P. \text{falciparum}\) are spaced \(2.5*10^5 \mu l^{-1}\) apart. (A) \(\Delta ST = +10\) weeks. (B) \(\Delta ST = 0\). (C) \(\Delta ST = -10\) weeks. The gray shading from dark gray to white is to guide the eye from lowest to maximum values. The darkest gray shows values between 0 and the first contour. Black shading is where the host dies before the second infection begins.
Figure S5: *P. falciparum* parasitemia, varying with basic reproduction rates $R_{0V}$ and $R_{0F}$, with a compensatory RBC source. For both *P. falciparum* and *P. vivax*, $p = 16$. Contours are spaced $7.5 \times 10^4 \mu l^{-1}$ apart for peak count $I_{PK}$, and $2.5 \times 10^5 \mu l^{-1}$ apart for integrated count $I_{INT}$. (A) $\Delta ST = + 10$ weeks. (B) $\Delta ST = 0$. (C) $\Delta ST = -10$ weeks. The gray shading from dark gray to white is to guide the eye from lowest to maximum values. The darkest gray shows values between 0 and the first contour. Black shading is where the host dies before the second infection begins.

Figure S6: *P. falciparum* parasitemia, varying with basic reproduction rates $R_{0V}$ and $R_{0F}$, with *P. falciparum* infecting 50 weeks before *P. vivax* ($\Delta ST = -50$), with a diserythropoetic RBC source. “Pv p” refers to the value of $p$ for *P. vivax*. For simulations depicted, $p = 16$ for *P. falciparum*. The gray shading from dark gray to white is to guide the eye from lowest to maximum values. The darkest gray shows values between 0 and the first contour. Black shading is where the host dies before the second infection begins. (A) $I_{PK}$ for *P. falciparum*. Contours are spaced $10^4 \mu l^{-1}$ apart for $\tau_{ret} = 1.5$ day and $2 \times 10^4 \mu l^{-1}$ apart for $\tau_{ret} = 14$ day. (B) $I_{INT}$ for *P. falciparum*. Contours are spaced $2.5 \times 10^5 \mu l^{-1}$ apart for all values of $p$ and $\tau_{ret}$

Figure S7: Time series of parasitemia and RBC count $R_{0F} = 1.087$ and $R_{0V} = 1.320$ with a diserythropoetic source with time delay. All series are plotted against $T_{INC}$, the time since the host was inoculated with the initial infecting species. The RBC source was not allowed to return to homeostasis for 180 days after it had reached its minimum rate of
0.8X the basal rate. (A) Count of RBCs infected with *P. vivax* vs. *T*\textsubscript{INC}. (B): Count of RBCs infected with *P. falciparum* vs. *T*\textsubscript{INC}. (C): Ratio of reticulocyte count to basal reticulocyte count vs. *T*\textsubscript{INC}. (D). Ratio of RBC count to basal RBC count vs. *T*\textsubscript{INC}. Black curve shows plot for dual species infection; dotted curve shows plot for *P. vivax*- only infection with $R_0V = 1.320$, and gray curves shows plot for *P. falciparum*- only infection with $R_0F = 1.087$. Black curve shows plot for dual species infection; dotted curve shows plot for *P. vivax*- only infection with $R_0V = 1.320$, and gray curves shows plot for *P. falciparum*- only infection with corresponding $R_0F = 1.087$. When the curve for the dual infection overlaps with a curve for a monospecies infection, only the one for dual infection is shown.