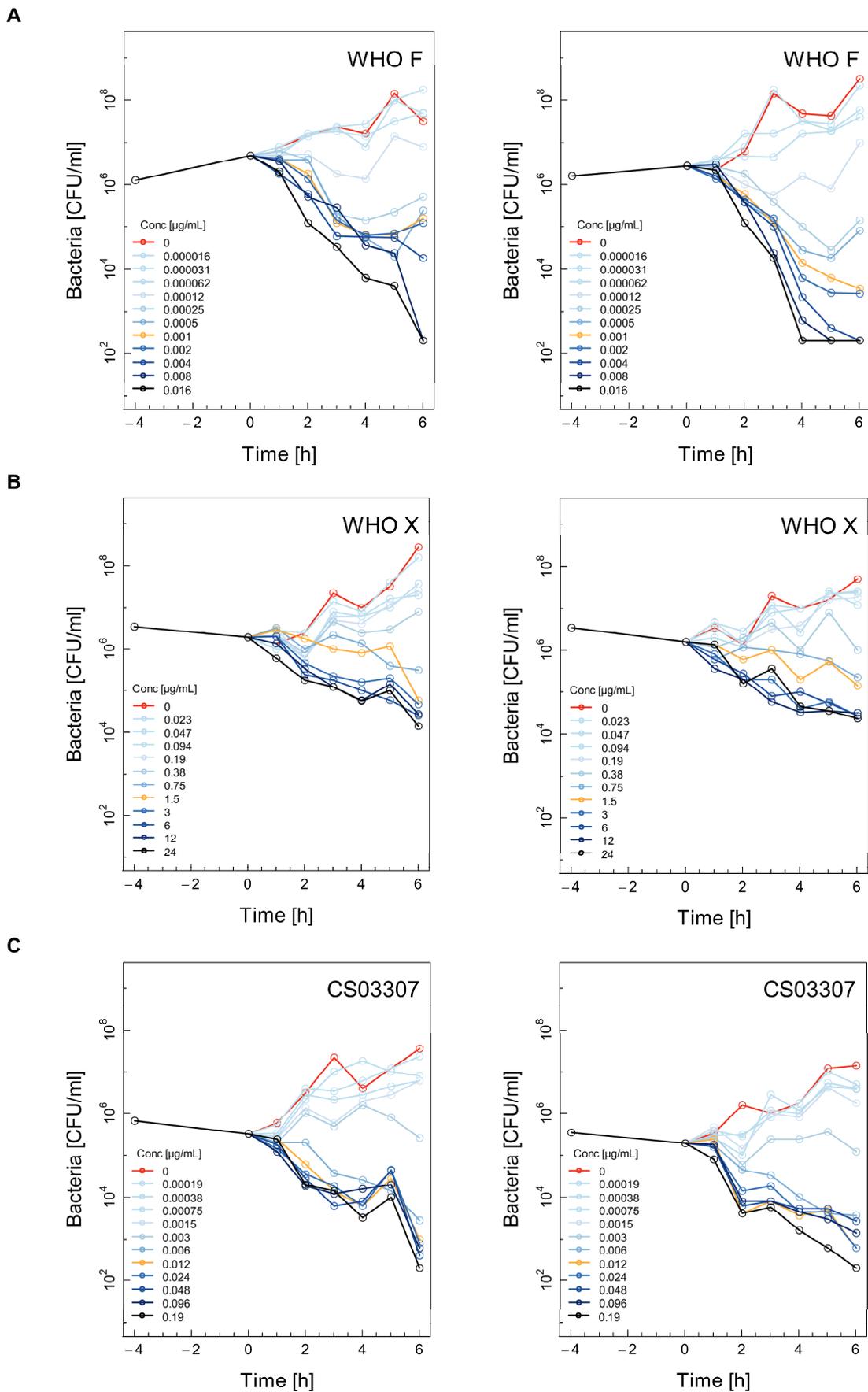


## Supplementary Materials

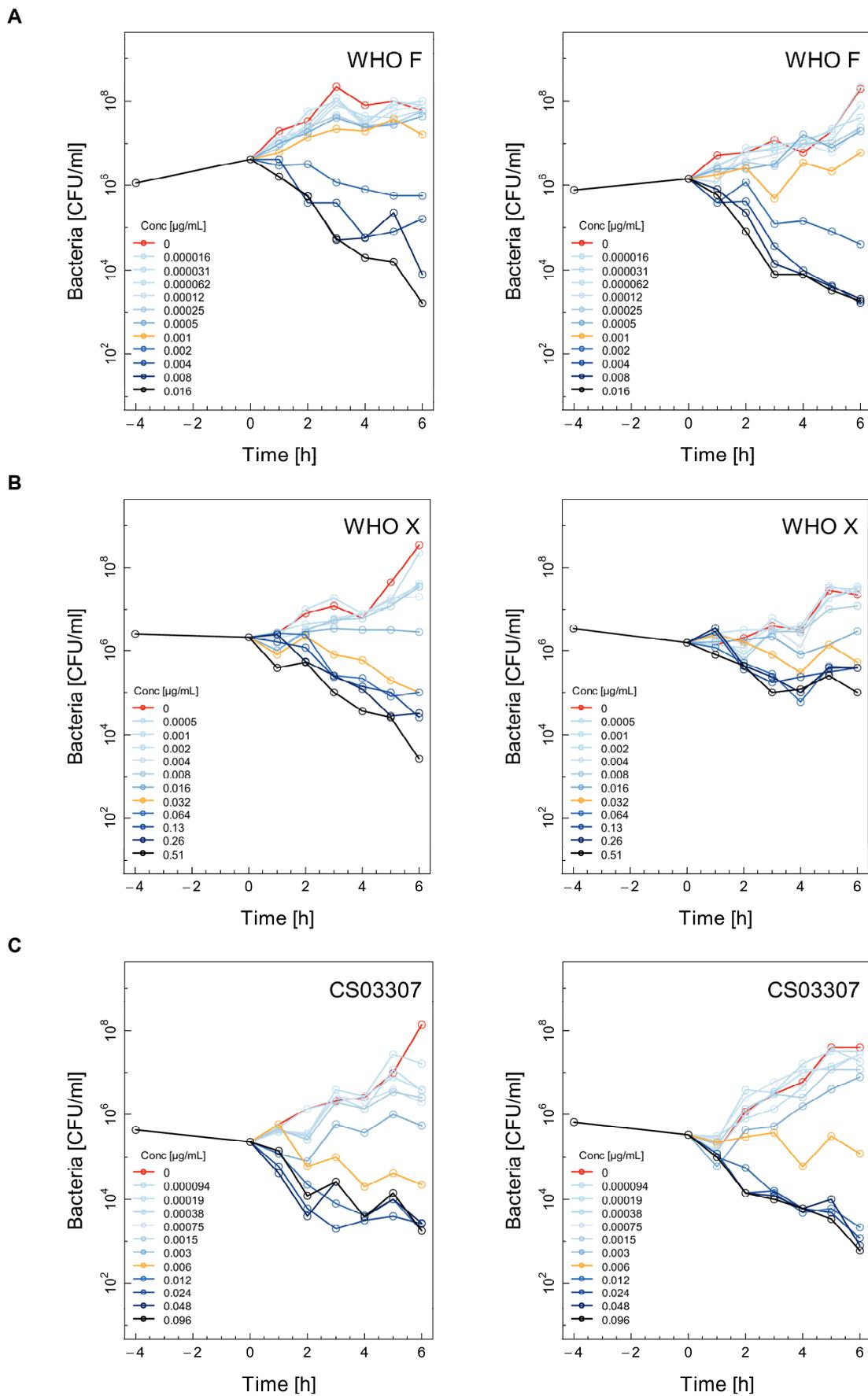
**Table S1.** Strain-per-strain comparisons of pharmacodynamic parameters for each antimicrobial

Antibiotic	Parameter	Strain comparison (p-value)		
		WHO F vs WHO X	WHO F vs CS03307	WHO X vs CS03307
CRO	$\psi_{\max}$	0.23	0.31	0.35
	$\psi_{\min}$	<0.0001	<0.0001	0.11
	$\kappa$	0.0169	<0.0001	0.0031
	zMIC	<0.0001	<0.0001	<0.0001
ERT	$\psi_{\max}$	0.43	<0.0001	0.097
	$\psi_{\min}$	<0.0001	<0.0001	0.0049
	$\kappa$	0.011	0.12	0.0013
	zMIC	<0.0001	<0.0001	<0.0001
FOS	$\psi_{\max}$	0.64	0.23	0.12
	$\psi_{\min}$	<0.0001	0.68	<0.0001
	$\kappa$	0.47	0.086	0.31
	zMIC	0.073	0.0001	<0.0001
GEN	$\psi_{\max}$	0.81	0.28	0.32
	$\psi_{\min}$	0.64	0.25	0.25
	$\kappa$	0.90	0.94	0.95
	zMIC	0.041	0.0039	0.84

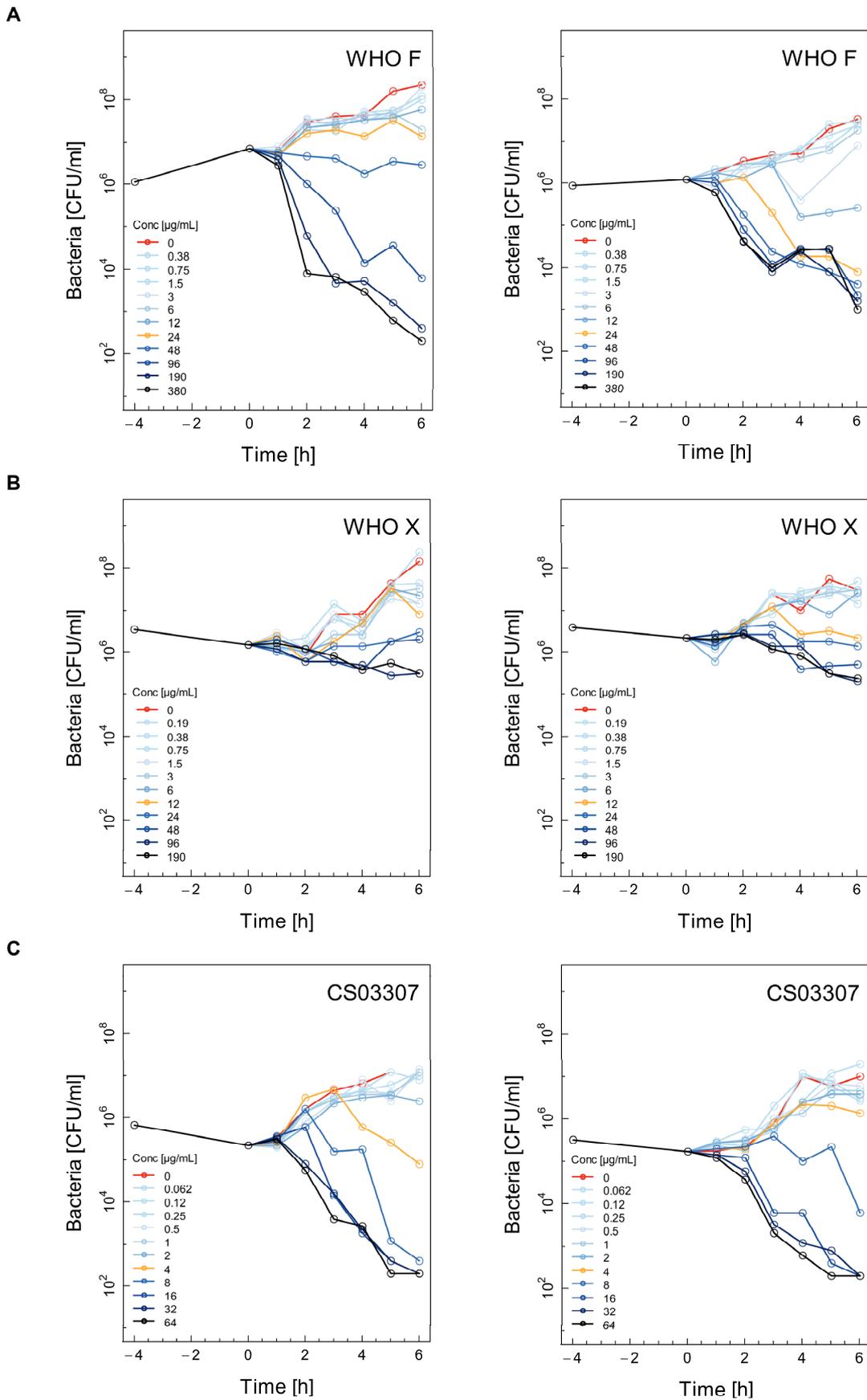
P-values comparing parameters strain-per-strain are given above. Parameter estimates were obtained using a system of seemingly unrelated, non-linear regression models (Methods). Abbreviations: CRO, ceftriaxone; ERT, ertapenem; FOS, fosfomicin; GEN, gentamicin.



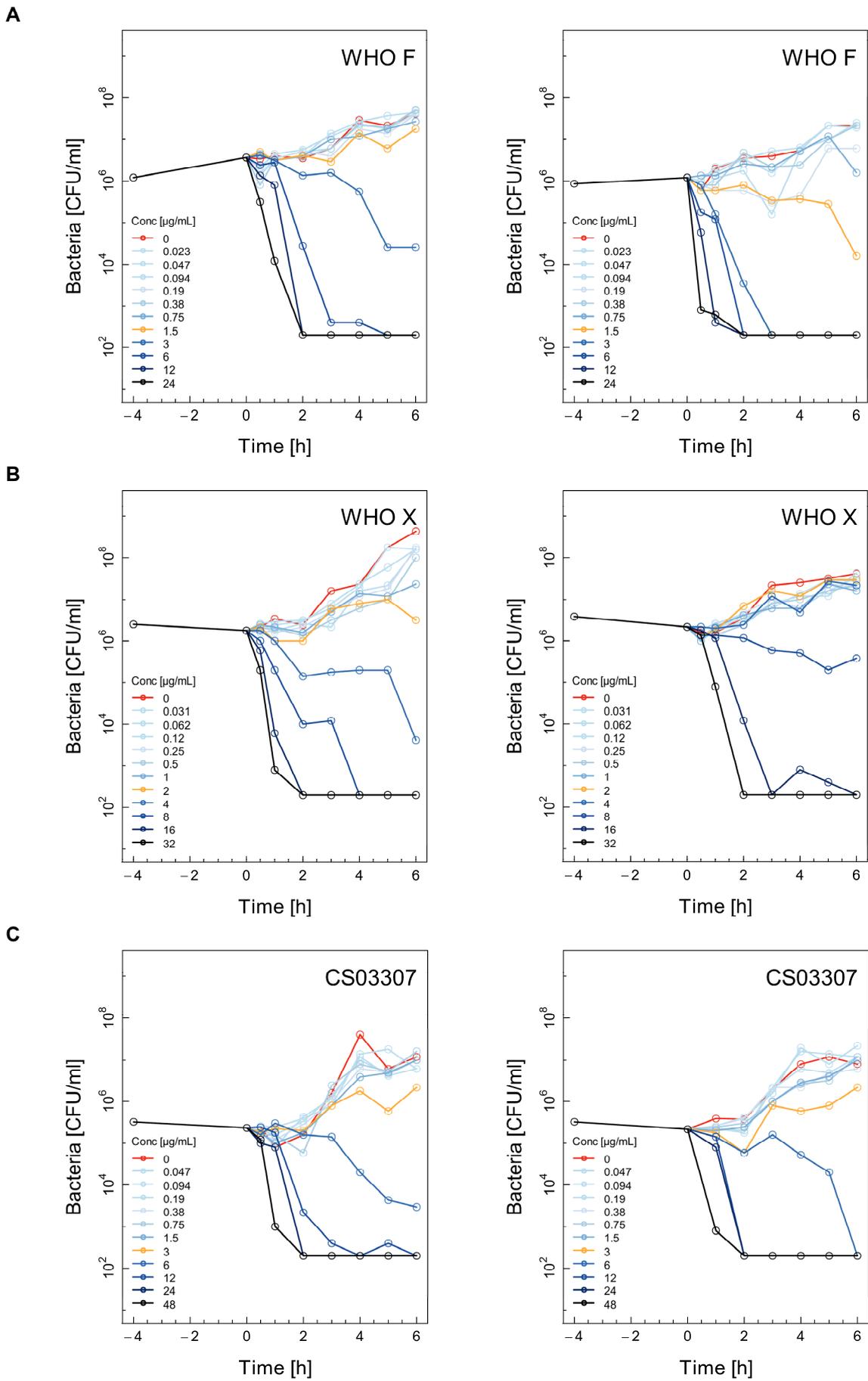
**Supplementary Figure S1.** Remaining time-kill curves (TKC) (i.e., the curves not shown in Figure 1) for three different strains of *Neisseria gonorrhoeae* using ceftriaxone. For each strain, TKC from two of the three independent experiments is shown: WHO F (**A**), WHO X (**B**), CS03307 (**C**). For each figure, eleven doubling dilutions are plotted. The black line corresponds to the highest concentration of antibiotics used in the assay [16x the minimum inhibitory concentration (MIC)]. The yellow line represents the concentration corresponding to 1x MIC, while the red line represents growth in the absence of antimicrobials. The number of colony forming units (CFU)/ml was measured from 4 hours before until 6 hours after the addition of antimicrobials. The limit of detection was 200 CFU/ml.



**Supplementary Figure S2.** Remaining time-kill curves (TKC) (i.e., the curves not shown in Figure 2) for three different strains of *Neisseria gonorrhoeae* using ertapenem. For each strain, TKC from two of the three independent experiments is shown: WHO F (**A**), WHO X (**B**), CS03307 (**C**). For each figure, eleven doubling dilutions are plotted. The black line corresponds to the highest concentration of antibiotics used in the assay [16x the minimum inhibitory concentration (MIC)]. The yellow line represents the concentration corresponding to 1x MIC, while the red line represents growth in the absence of antimicrobials. The number of colony forming units (CFU)/ml was measured from 4 hours before until 6 hours after the addition of antimicrobials. The limit of detection was 200 CFU/ml.



**Supplementary Figure S3.** Remaining time-kill curves (TKC) (i.e., the curves not shown in Figure 3) for three different strains of *Neisseria gonorrhoeae* using fosfomycin. For each strain, TKC from two of the three independent experiments is shown: WHO F (A), WHO X (B), CS03307 (C). For each figure, eleven doubling dilutions are plotted. The black line corresponds to the highest concentration of antibiotics used in the assay [16x the minimum inhibitory concentration (MIC)]. The yellow line represents the concentration corresponding to 1x MIC, while the red line represents growth in the absence of antimicrobials. The number of colony forming units (CFU)/ml was measured from 4 hours before until 6 hours after the addition of antimicrobials. The limit of detection was 200 CFU/ml.



**Supplementary Figure S4.** Remaining time-kill curves (TKC) (i.e., the curves not shown in Figure 4) for three different strains of *Neisseria gonorrhoeae* using gentamicin. For each strain, TKC from two of the three independent experiments is shown: WHO F (**A**), WHO X (**B**), CS03307 (**C**). For each figure, eleven doubling dilutions are plotted. The black line corresponds to the highest concentration of antibiotics used in the assay [16x the minimum inhibitory concentration (MIC)]. The yellow line represents the concentration corresponding to 1x MIC, while the red line represents growth in the absence of antimicrobials. The number of colony forming units (CFU)/ml was measured from 4 hours before until 6 hours after the addition of antimicrobials. The limit of detection was 200 CFU/ml.