**Figure 3-source data 2.** Competing models for fitting T cell reconstitution with respective AIC values. Best fit in bold-red (lowest AIC). The AIC values presented for each statistical assumption is the lowest of 10 runs of the SAEM algorithm with different randomly selected initial guesses.

|  |  |  |  |
| --- | --- | --- | --- |
| **Model** | **Mechanistic Assumptions** | **Statistical Assumptions** | **ΔAIC** |
| 1 | * Full model as in **eq. 2** in main text.
* Does not include compartment *Np2*
 | * All random effects>0.
* No correlations among parameters.
 | 42.4 |
| * All random effects>0.
* $corr(\hat{r}\_{s}$,$ \hat{r}\_{e})\ne 0.$
* $corr(N\_{0}$,$E\_{0})\ne 0$.
 | 24.9 |
| * All random effects>0.
* $corr(\hat{r}\_{s}$,$ \hat{r}\_{e})\ne 0.$
* $corr(N\_{0}$,$E\_{0})\ne 0$.
* $corr(K\_{p}$,$E\_{0})\ne 0$.
* $corr(N\_{0}$,$K\_{p})\ne 0$.
 | 26.8 |
| 2 | * CD4+CCR5+ T cells do not downregulate CCR5 ($λ\_{s}=0$).
* Does not include compartment *Np2*
 | * All random effects>0.
* No correlations among parameters.
 | 78.4 |
| 3 | * Thymic export rate of naïve CD4+ and CD8+ T cells is the same ($λ\_{e}=λ\_{f}$).
* Does not include compartment *Np2*
 | * All random effects>0.
* No correlations among parameters.
 | 41.7 |
| * All random effects>0.
* $corr(\hat{r}\_{s}$,$ \hat{r}\_{e})\ne 0.$
* $corr(N\_{0}$,$E\_{0})\ne 0$.
 | 25.9 |
| * All random effects>0.
* $corr(\hat{r}\_{s}$,$ \hat{r}\_{e})\ne 0.$
* $corr(N\_{0}$,$E\_{0})\ne 0$.
* $corr(K\_{p}$,$E\_{0})\ne 0$.
* $corr(N\_{0}$,$K\_{p})\ne 0$.
 | 28.1 |
| 4 | * CD4+CCR5+ T cells do not downregulate CCR5 ($λ\_{s}=0$).
* Thymic export rate of naïve CD4+ and CD8+ T cells is the same ($λ\_{e}=λ\_{f}$) .
* Does not include compartment *Np2*
 | * All random effects>0.
* No correlations among parameters.
 | 69.2 |
| 5 | * CD4+CCR5- T cells are long-lived and do not proliferate ($r\_{n}=d\_{n}=0$).
* Does not include compartment *Np2*
 | * All random effects>0.
* No correlations among parameters.
 | 45.9 |
| 6 | * CD4+CCR5- T cells are long-lived and do not proliferate ($r\_{n}=d\_{n}=0$).
* CD4+CCR5+ T cells do not downregulate CCR5 ($λ\_{s}=0$).
* Does not include compartment *Np2*
 | * All random effects>0.
* No correlations among parameters.
 | 70.1 |
| 7 | * CD4+CCR5- T cells are long-lived and do not proliferate ($r\_{n}=d\_{n}=0$).
* Thymic export rate of naïve CD4+ and CD8+ T cells is the same ($λ\_{e}=λ\_{f}$).
* Does not include compartment *Np2*
 | * All random effects>0.
* No correlations among parameters.
 | 53.5 |
| 8 | * CD4+CCR5- T cells are long-lived and do not proliferate ($r\_{n}=d\_{n}=0$).
* Thymic export rate of naïve CD4+ and CD8+ T cells is the same ($λ\_{e}=λ\_{f}$).
* CD4+CCR5+ T cells do not downregulate CCR5 ($λ\_{s}=0$).
* Does not include compartment *Np2*
 | * All random effects>0.
* No correlations among parameters.
 | 91.1 |
| 9 | * CD4+CCR5- T cells do not proliferate ($r\_{n}=0$).
* Does not include compartment *Np2*
 | * All random effects>0.
* No correlations among parameters.
 | 44.5 |
| * All random effects>0.
* $corr(\hat{r}\_{s}$,$ \hat{r}\_{e})\ne 0.$
* $corr(N\_{0}$,$E\_{0})\ne 0$.
 | 27.3 |
| * All random effects>0.
* $corr(\hat{r}\_{s}$,$ \hat{r}\_{e})\ne 0.$
* $corr(N\_{0}$,$E\_{0})\ne 0$.
* $corr(K\_{p}$,$E\_{0})\ne 0$.
* $corr(N\_{0}$,$K\_{p})\ne 0$.
 | 23.2 |
| 10 | * CD4+CCR5- T cells do not proliferate ($r\_{n}=0$).
* CD4+CCR5+ T cells do not downregulate CCR5 ($λ\_{s}=0$).
* Does not include compartment *Np2*
 | * All random effects>0.
* No correlations among parameters.
 | 67.0 |
| 11 | * CD4+CCR5- T cells do not proliferate ($r\_{n}=0$).
* Thymic export rate of naïve CD4+ and CD8+ T cells is the same ($λ\_{e}=λ\_{f}$).
* Does not include compartment *Np2*
 | * All random effects>0,
* no correlations.
 | 45.7 |
| * All random effects>0.
* $corr(\hat{r}\_{s}$,$ \hat{r}\_{e})\ne 0.$
* $corr(N\_{0}$,$E\_{0})\ne 0$.
 | 21.2 |
| * All random effects>0.
* $corr(\hat{r}\_{s}$,$ \hat{r}\_{e})\ne 0.$
* $corr(N\_{0}$,$E\_{0})\ne 0$.
* $corr(K\_{p}$,$E\_{0})\ne 0$.
* $corr(N\_{0}$,$K\_{p})\ne 0$.
 | 18.7 |
| * Random effects equal to zero for parameters: $\hat{r}\_{m}$, $λ\_{n}$, $λ\_{s}$, $\hat{d}\_{n}$, $K\_{s}$, and $K\_{e}.$
* All random effects>0.
* $corr(\hat{r}\_{s}$,$ \hat{r}\_{e})\ne 0.$
* $corr(N\_{0}$,$E\_{0})\ne 0$.
* $corr(K\_{p}$,$E\_{0})\ne 0$.
* $corr(N\_{0}$,$K\_{p})\ne 0$.
 | 2.8 |
| * Random effects equal to zero for parameters: $\hat{r}\_{m}$, $λ\_{e}$, $\hat{d}\_{n}$, $K\_{s}$, and $K\_{e}.$
* $corr(\hat{r}\_{s}$,$ \hat{r}\_{e})\ne 0.$
* $corr(N\_{0}$,$E\_{0})\ne 0$.
* $corr(K\_{p}$,$E\_{0})\ne 0$.
* $corr(N\_{0}$,$K\_{p})\ne 0$.
 | **0.0** |
| 12 | * CD4+CCR5- T cells do not proliferate ($r\_{n}=0$).
* Thymic export rate of naïve CD4+ and CD8+ T cells is the same ($λ\_{e}=λ\_{f}$).
* CD4+CCR5+ T cells do not downregulate CCR5 ($λ\_{s}=0$).
* Does not include compartment *Np2*
 | * All random effects>0.
* No correlations among parameters.
 | 63.8 |
| 13 | * Full model as in **eq. 2** in main text.
* Includes compartment *Np2*
 | * All random effects>0.
* No correlations among parameters.
 | 42.2 |
| * All random effects>0.
* $corr(\hat{r}\_{s}$,$ \hat{r}\_{e})\ne 0.$
* $corr(N\_{0}$,$E\_{0})\ne 0$.
 | 26.1 |
| * All random effects>0.
* $corr(\hat{r}\_{s}$,$ \hat{r}\_{e})\ne 0.$
* $corr(N\_{0}$,$E\_{0})\ne 0$.
* $corr(K\_{p}$,$E\_{0})\ne 0$.
* $corr(N\_{0}$,$K\_{p})\ne 0$.
 | 30.5 |
| 14 | * CD4+CCR5+ T cells do not downregulate CCR5 ($λ\_{s}=0$).
* Includes compartment *Np2*
 | * All random effects>0.
* No correlations among parameters.
 | 81.3 |
| 15 | * Thymic export rate of naïve CD4+ and CD8+ T cells is the same ($λ\_{e}=λ\_{f}$).
* Includes compartment *Np2*
 | * All random effects>0.
* No correlations among parameters.
 | 55.3 |
| * All random effects>0.
* $corr(\hat{r}\_{s}$,$ \hat{r}\_{e})\ne 0.$
* $corr(N\_{0}$,$E\_{0})\ne 0$.
 | 47.1 |
| 16 | * CD4+CCR5+ T cells do not downregulate CCR5 ($λ\_{s}=0$).
* Thymic export rate of naïve CD4+ and CD8+ T cells is the same ($λ\_{e}=λ\_{f}$) .
* Includes compartment *Np2*
 | * All random effects>0.
* No correlations among parameters.
 | 71.7 |
| 17 | * CD4+CCR5- T cells are long-lived and do not proliferate ($r\_{n}=d\_{n}=0$).
* Includes compartment *Np2*
 | * All random effects>0.
* No correlations among parameters.
 | 44.5 |
| 18 | * CD4+CCR5- T cells are long-lived and do not proliferate ($r\_{n}=d\_{n}=0$).
* CD4+CCR5+ T cells do not downregulate CCR5 ($λ\_{s}=0$).
* Includes compartment *Np2*
 | * All random effects>0.
* No correlations among parameters.
 | 67.3 |
| 19 | * CD4+CCR5- T cells are long-lived and do not proliferate ($r\_{n}=d\_{n}=0$).
* Thymic export rate of naïve CD4+ and CD8+ T cells is the same ($λ\_{e}=λ\_{f}$).
* Includes compartment *Np2*
 | * All random effects>0.
* No correlations among parameters.
 | 52.6 |
| 20 | * CD4+CCR5- T cells are long-lived and do not proliferate ($r\_{n}=d\_{n}=0$).
* Thymic export rate of naïve CD4+ and CD8+ T cells is the same ($λ\_{e}=λ\_{f}$).
* CD4+CCR5+ T cells do not downregulate CCR5 ($λ\_{s}=0$).
* Includes compartment *Np2*
 | * All random effects>0.
* No correlations among parameters.
 | 87.4 |
| 21 | * CD4+CCR5- T cells do not proliferate ($r\_{n}=0$).
* Includes compartment *Np2*
 | * All random effects>0.
* No correlations among parameters.
 | 44.4 |
| * All random effects>0.
* $corr(\hat{r}\_{s}$,$ \hat{r}\_{e})\ne 0.$
* $corr(N\_{0}$,$E\_{0})\ne 0$.
 | 18.6 |
| * All random effects>0.
* $corr(\hat{r}\_{s}$,$ \hat{r}\_{e})\ne 0.$
* $corr(N\_{0}$,$E\_{0})\ne 0$.
* $corr(K\_{p}$,$E\_{0})\ne 0$.
* $corr(N\_{0}$,$K\_{p})\ne 0$.
 | 15.0 |
| 22 | * CD4+CCR5- T cells do not proliferate ($r\_{n}=0$).
* CD4+CCR5+ T cells do not downregulate CCR5 ($λ\_{s}=0$).
* Includes compartment *Np2*
 | * All random effects>0.
* No correlations among parameters.
 | 68.0 |
| 23 | * CD4+CCR5- T cells do not proliferate ($r\_{n}=0$).
* Thymic export rate of naïve CD4+ and CD8+ T cells is the same ($λ\_{e}=λ\_{f}$).
* Includes compartment *Np2*
 | * All random effects>0,
* no correlations.
 | 44.3 |
| * All random effects>0.
* $corr(\hat{r}\_{s}$,$ \hat{r}\_{e})\ne 0.$
* $corr(N\_{0}$,$E\_{0})\ne 0$.
 | 21.3 |
| * All random effects>0.
* $corr(\hat{r}\_{s}$,$ \hat{r}\_{e})\ne 0.$
* $corr(N\_{0}$,$E\_{0})\ne 0$.
* $corr(K\_{p}$,$E\_{0})\ne 0$.
* $corr(N\_{0}$,$K\_{p})\ne 0$.
 | 18.5 |
| * Random effects equal to zero for parameters: $\hat{r}\_{m}$, $λ\_{n}$, $λ\_{s}$, $\hat{d}\_{n}$, $K\_{s}$, and $K\_{e}.$
* All random effects>0.
* $corr(\hat{r}\_{s}$,$ \hat{r}\_{e})\ne 0.$
* $corr(N\_{0}$,$E\_{0})\ne 0$.
* $corr(K\_{p}$,$E\_{0})\ne 0$.
* $corr(N\_{0}$,$K\_{p})\ne 0$.
 | 2.2 |
| * Random effects equal to zero for parameters: $\hat{r}\_{m}$, $λ\_{e}$, $\hat{d}\_{n}$, $K\_{s}$, and $K\_{e}.$
* $corr(\hat{r}\_{s}$,$ \hat{r}\_{e})\ne 0.$
* $corr(N\_{0}$,$E\_{0})\ne 0$.
* $corr(K\_{p}$,$E\_{0})\ne 0$.
* $corr(N\_{0}$,$K\_{p})\ne 0$.
 | **0.2** |
| 24 | * CD4+CCR5- T cells do not proliferate ($r\_{n}=0$).
* Thymic export rate of naïve CD4+ and CD8+ T cells is the same ($λ\_{e}=λ\_{f}$).
* CD4+CCR5+ T cells do not downregulate CCR5 ($λ\_{s}=0$).
* Includes compartment *Np2*
 | * All random effects>0.
* No correlations among parameters.
 | 64.2 |