Derivation of equation 7

The following is the derivation of equation 7 in the main text. Please note, full details can be found in [1] and that this simplified model and these assumptions are only used as a way to estimate the transmission coefficient parameter, β, and not to model the filovirus dynamics within bats *per se*. The basic model is a susceptible (S), infected (I), recovered (R) model.

The assumptions are that infection transmission is direct, horizontal and not vertical (*in utero*), and that individuals are born susceptible (S), then infected (I) and recover from infection, with life-long immunity (R). Here age homogeneity is assumed and thus parameters are constant with respect to age. Births occur at a rate b, deaths at rate μ, infections at rate λ and recovery from infection at rate v, with no disease-induced mortality. The population size is assumed to be constant and thus the population birth rate, b, is assumed to be equal to the mortality rate, μ.

This leads to the following differential equation for the SIR system:

$$dS(t)/dt = \mu N - \beta I(t)S(t) - \mu S(t) \tag{S1}$$

$$dI(t)/dt = \beta I(t)S(t) - \nu I(t) - \mu I(t)$$

$$dR(t)/dt = \nu I(t) - \mu R(t)$$

By dividing the variables by the population size, N, the number susceptible S, becomes the fraction s, number infected I the fraction infected, i, and likewise for the recovered (R becomes r). As noted in [1], the transmission then becomes frequency-dependent (and see [2]). However, though the units of the β change, because the population size is constant the two terms are the same in this instance [1]. Following [1], I use the $\tilde{\beta}$ to denote the change in units and that $\tilde{\beta}$ now reflects βN.

This division leads to the revised set of differential equations, with the population now in proportions (*s*, *i,* and *r*):

$$ds(t)/_{dt} = \mu - \tilde{\beta} i(t)s(t) - \mu s(t) \tag{S2}$$

$$di(t)/_{dt} = \tilde{\beta} i(t)s(t) - \nu i(t) - \mu i(t)$$

$$dr(t)/_{dt} = \nu i(t) - \mu r(t)$$

This simple set of differential equations is what allows equation 7 in the main text to be derived. Assuming the system is at equilibrium (∞), *ds(t)/dt=di(t)/dt=dr(t)/dt=0.* The term for the infected class becomes:

$$di(t)/_{dt} = 0 \rightarrow \ \tilde{\beta} i(t)s(t) - \nu i(t) - \mu i(t) = 0 \rightarrow i(t)\big(\tilde{\beta} s(t) - \nu - \mu\big) = 0 \rightarrow i(\infty) = 0, \text{(S3)}$$

$$or\ \big(\tilde{\beta} s(t) - \nu - \mu\big) = 0 \rightarrow \ s(\infty) = \frac{(\nu+\mu)}{\tilde{\beta}} \tag{S4}$$

Thus, the term:

$$s(\infty) = \frac{(\nu+\mu)}{\tilde{\beta}} = \frac{1}{R_0} \tag{S5}$$

To derive the term for *i(∞)* the term for *s(∞)* is simply substituted into the *i(∞)* term *di(t)/dt=0* and rearranged so that:

$$\frac{ds(t)}{dt} = 0 \rightarrow i(\infty) = \frac{\mu}{\tilde{\beta}}(R_0 - 1) \tag{S6}$$

This leads to the final equation 7 in the main text, where:

$$s(\infty) = \frac{1}{R_0}, \text{and } i(\infty) = \frac{\mu}{\tilde{\beta}}(R_0 - 1) \tag{S7}$$

Sensitivity analysis

The partial-rank correlation coefficients (PRCC) between each parameter and model output determined the relative importance of each parameter. In a K+1 by K+1 symmetric matrix, C, where K is the number of parameters, and 1 to N is the rank of each column defined by the set (r_{1i}, r_{2i}, … r_{ki}, R_i), where i = run number, μ = the average rank $((1+N)/2)$, the matrix C is defined with elements C_{ij}, such that:

$$C_{ij} = \frac{\sum_{t=1}^{N}(r_{it}-\mu)(r_{jt}-\mu)}{\sqrt{\sum_{t=1}^{N}(r_{it}-\mu)^2 \sum_{s=1}^{N}(r_{js}-\mu)^2}} \quad i, j = 1, 2, \ldots K. \tag{S8}$$

R_i replaces r_{ij} and r_{is} for the $C_{j,\ K+1}$ elements, and the inverse of C becomes b_{ij} for matrix B. The PRCC between the ith parameter and yth variable is then:

$$PRCC_{iy} = \frac{-b_{i,K+1}}{\sqrt{b_i b_{K+1,K+1}}} \tag{S9}$$

In the PRCC analysis a positive PRCC indicates that as the parameter increases, virus persistence in the population increases and a negative PRCC indicates virus persistence decreases with increasing parameter values [3, 4]. Significance (t_{iy}) of PRCC$_{iy}$ is determined by a student's T distribution with N-2 degrees of freedom, thus:

$$t_{iy} = PRCC_{iy}\sqrt{\frac{N-2}{1-PRCC_{iy}}} \tag{S10}$$

Supplementary Figures

Figure S1: The periodic Gaussian function used to model seasonal births. A fixed birth rate of close to 1 birth per female per year (0.49 per capita per year) with synchrony (s), from 1.43 (low synchrony, dotted lines) to 143.5 (high synchrony, dashed lines) (the range used in the partial rank correlation coefficient sensitivity analysis), with the default for the analyses (14.35, solid lines) shown. One (grey) or 2 (black) birth pulses (*ω*) per year are shown.

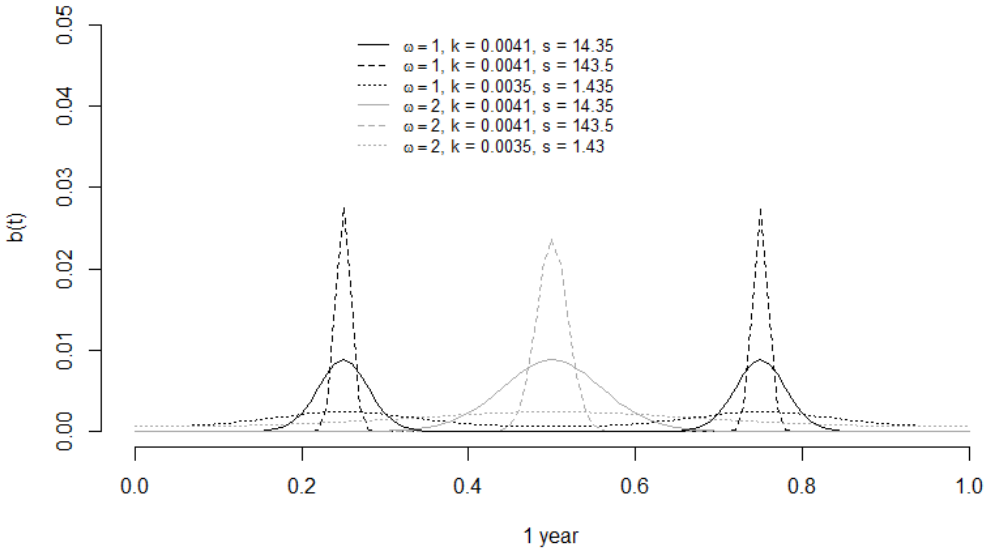


Figure S2: The proportion of 500 simulations for which filovirus infection was present after 25 years for different population sizes. Models have either 1 (a and b) or 2 (c and d) birth pulses per year and with two different incubation periods ($1/\sigma$) estimated from data. The remaining parameter values are given in Table 1.

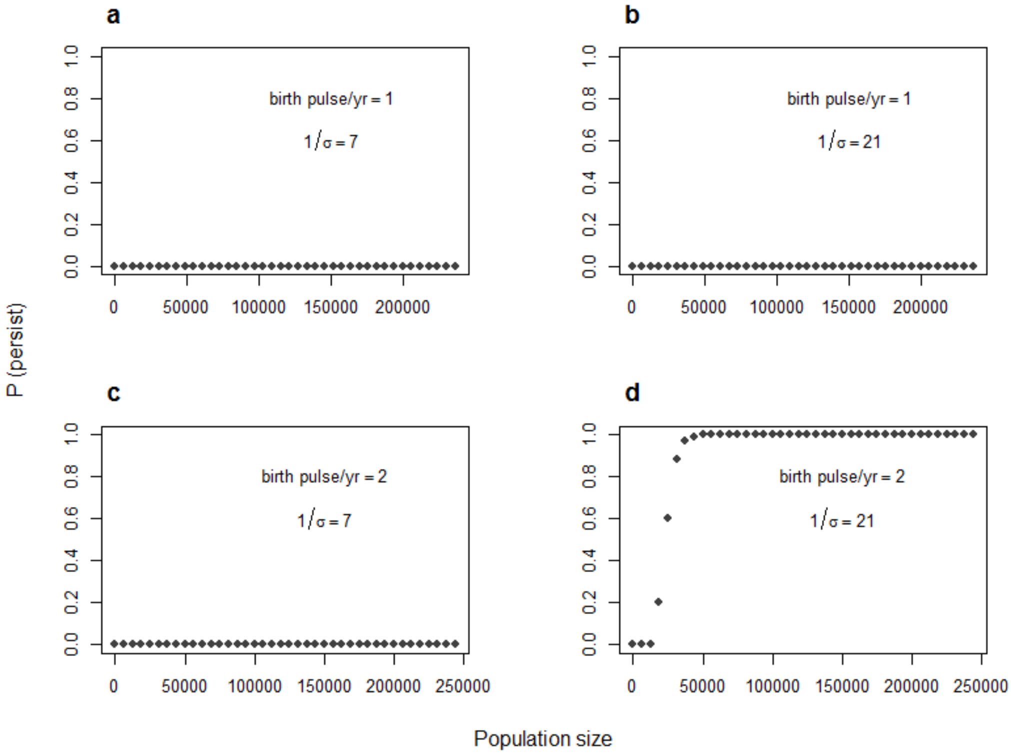


Figure S3: The mean prevalence (a), antibody prevalence (seroprevalence, b) and probability of persistence (c) predicted by the model for a range of population sizes. These are calculated from 500 simulations after a 25 year model run for different population sizes with 2 birth pulses per year and a 21 day incubation period (1/σ). Adult (close circles) and juvenile (open circles) seroprevalence is shown in b. Remaining parameters are in Table 1.

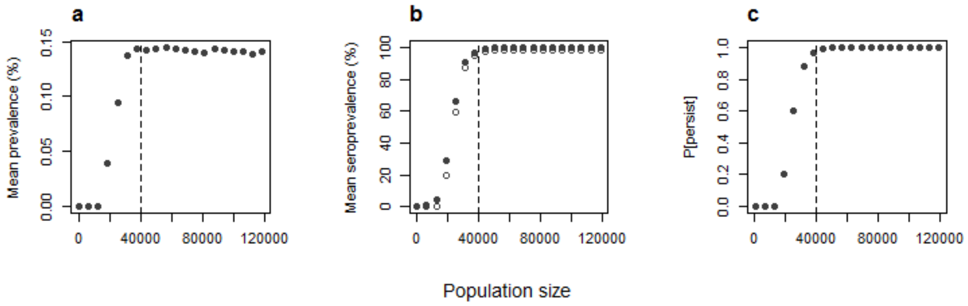


Figure S4: Sensitivity analysis results using partial rank correlation coefficients (PRCC) for the output variable infection persistence. Parameter values and results are in Table 1. Infection persistence was calculated as the proportion of the 500 simulations infection was present after a 25 year time period for each of the 500 parameter sets. Positive PRCC indicate increasing a parameter increases virus persistence. Parameters are: transmission rate β; adult mortality rate μ; juvenile mortality rate δ; disease induced mortality α; 1/incubation period σ; carrying capacity K; rate of seroconversion τ; annual birth synchrony s (where increasing s increases synchrony) and offset during the year φ. Significance at $\alpha = 0.05$ is demarcated by the (red) dashed line.

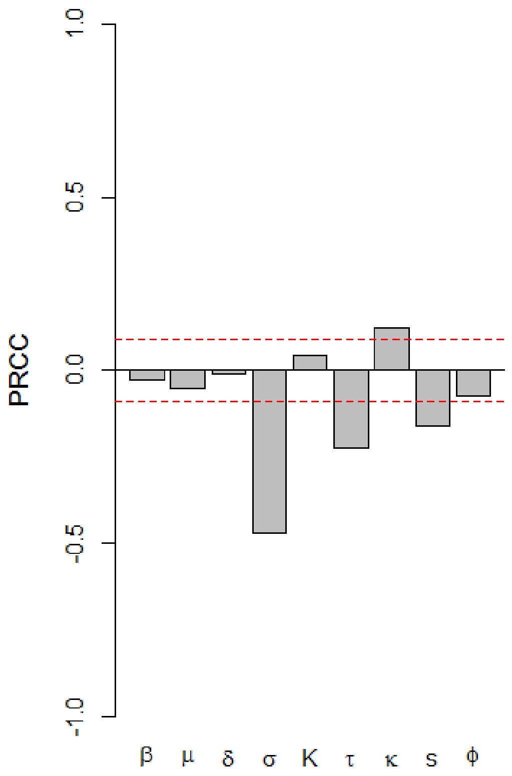


Figure S5: The effect of altering the incubation period (1/σ) and infectious period (1/τ) on pathogen persistence (z axis and panel). Persistence was estimated as the proportion of 500 simulations for which filovirus infection was present after 25 years for 100 incubation (1/σ) – infectious period (1/τ) combinations. All simulations had 2 annual birth pulses per year and the remaining perameters were the default parameters given in Table 1.

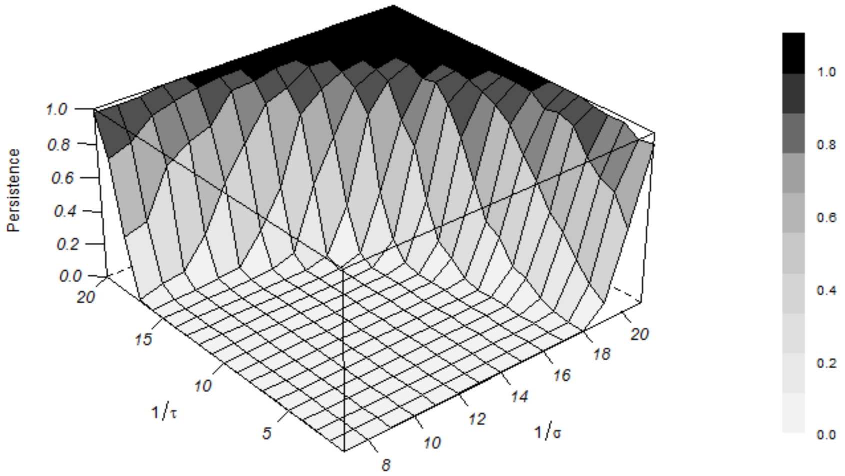
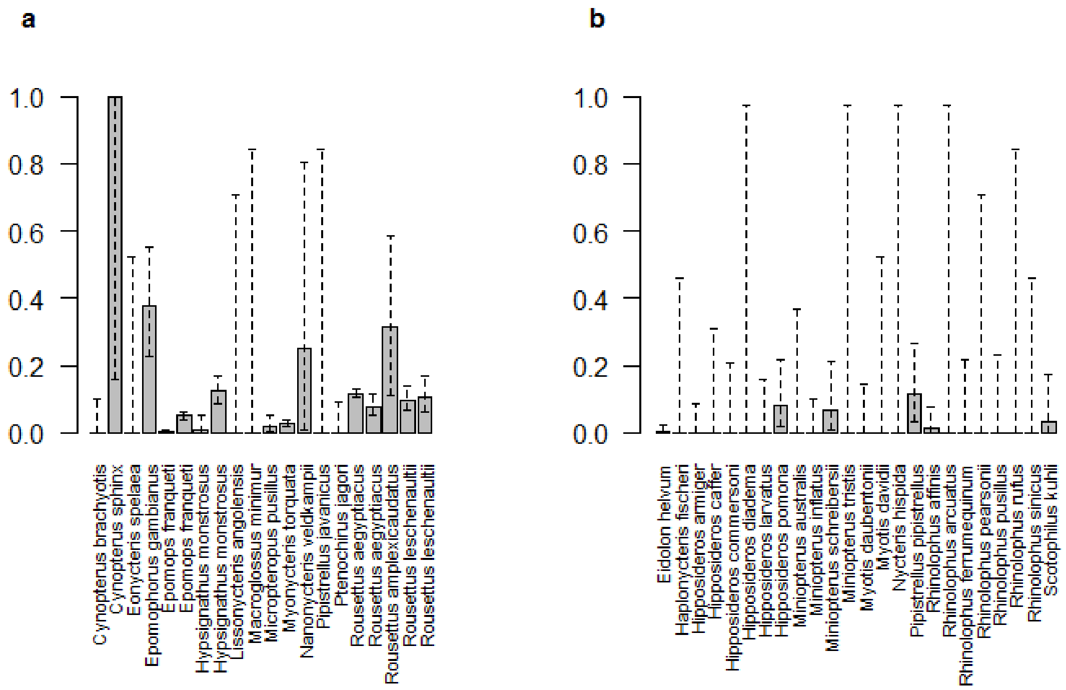


Figure S6: The proportion of bats seropositive with 95% confidence limits reported for 40 bat species. Those species with two or more seasonal birth pulses are in plotted in (a) and those with one annual birth pulse in (b). See Table S1 for details. Where a species is named twice, results for *Ebolavirus* and *Marburgvirus* are presented separately.



Supplementary Tables

Table S1*:* Serological findings for filovirus - bat systems.

virus	bat species	antibody positive	number tested	annual birth pulses	virus reference	birth pulse reference
Marburgvirus	*Epomops franqueti*	2	679	2	[5]	[6]
Marburgvirus	*Hypsignathus monstrosus*	1	103	2	[5]	[7]
Marburgvirus	*Miniopterus pusillus*	1	177	NA	[5]	
Marburgvirus	*Rhinolophus eloquens*	20	209	NA	[8]	
Marburgvirus	*Rousettus aegyptiacus*	21	229	2	[5]	[9]
Marburgvirus	*Rousettus aegyptiacus*	35	156	2	[8]	[9]
Marburgvirus	*Rousettus aegyptiacus*	13	546	2	[10]	[9]
Marburgvirus	*Rousettus aegyptiacus*	29	438	2	[11]	[9]
Marburgvirus	*Rousettus aegyptiacus*	250	1622	2	[9]	[9]
Marburgvirus	*Hipposideros caffer*	0	10	1	[5]	[12]
Marburgvirus	*Hipposideros commersoni*	0	16	1	[5]	[13]
Marburgvirus	*Nycteris hispida*	0	1	1	[5]	* [14]
Marburgvirus	*Lissonycteris angolensis*	0	3	2	[5]	[15]
Marburgvirus	*Miniopterus inflatus*	0	34	1	[5]	[16]
Reston	*Cynopterus sphinx*	2	2	2	[17]	[18, 19]

ebolavirus						
Reston ebolavirus	*Hipposideros pomona*	3	37	1	[17]	[20]
Reston ebolavirus	*Miniopterus schreibersii*	2	23	1	[17]	[21]
Reston ebolavirus	*Myotis pilosus*	4	83	NA	[17]	
Reston ebolavirus	*Pipistrellus pipistrellus*	4	35	1	[17]	[22]
Reston ebolavirus	*Rousettus amplexicaudatus*	5	16	2	[23]	[24]
Reston ebolavirus	*Rousettus leschenaultii*	11	126	2	[17]	[25]
Reston ebolavirus	*Scotophilus kuhlii*	1	25	1	[17]	[26]
Reston ebolavirus	*Rousettus leschenaultii*	15	141	2	[27]	[25]
Reston ebolavirus	*Hipposideros cineraceus*	0	111	NA	[17]	[28]
Reston ebolavirus	*Hipposideros armiger*	0	41	1	[17]	[29]
Reston ebolavirus	*Hipposideros larvatus*	0	21	1	[17]	[30]
Reston	*Rhinolophus affinis*	1	69	1	[17]	[26]*

ebolavirus						
Reston ebolavirus	*Rhinolophus ferrumequinum*	0	15	1	[17]	[31]
Reston ebolavirus	*Rhinolophus sinicus*	0	6	1	[17]	* [26]
Reston ebolavirus	*Rhinolophus pusillus*	0	14	1	[17]	* [26]
Reston ebolavirus	*Rhinolophus pearsonii*	0	3	1	[17]	* [26]
Reston ebolavirus	*Myotis davidii*	0	5	1	[17]	[26]
Reston ebolavirus	*Myotis chinensis*	0	6	NA	[17]	
Reston ebolavirus	*Myotis daubentonii*	0	24	1	[17]	[32]
Reston ebolavirus	*Myotis fimbriatus*	0	2	NA	[17]	
Reston ebolavirus	*Eonycteris spelaea*	0	5	2	[23]	[33]
Reston ebolavirus	*Cynopterus brachyotis*	0	35	2	[23]	[26]
Reston ebolavirus	*Ptenochirus jagori*	0	38	2	[23]	[34]
Reston	*Haplonycteris fischeri*	0	6	1	[23]	[35, 36]

ebolavirus						
Reston ebolavirus	*Macroglossus minimus*	0	2	2[#]	[23]	[26]
Reston ebolavirus	*Rhinolophus rufus*	0	2	1	[23]	[26]*
Reston ebolavirus	*Rhinolophus arcuatus*	0	1	1	[23]	[26]*
Reston ebolavirus	*Emballonura alecto*	0	9	NA	[23]	
Reston ebolavirus	*Pipistrellus javanicus*	0	2	3	[23]	[37]
Reston ebolavirus	*Scotophilus kuhlii*	0	5	1	[23]	[26]
Reston ebolavirus	*Miniopterus australis*	0	8	1	[23]	[38]
Reston ebolavirus	*Miniopterus schreibersii*	0	8	1	[23]	[21]
Reston ebolavirus	*Miniopterus tristis*	0	1	1	[23]	[26]*
Reston ebolavirus	*Hipposideros diadema*	0	1	1	[23]	[39, 40]
Reston ebolavirus	*Miniopterus macrotarsus*	0	1	NA	[23]	
Zaire ebolavirus	*Eidolon helvum*	1	262	1	[41]	[42]

Zaire ebolavirus	*Epomops franqueti*	36	805	2	[5]	[26]
Zaire ebolavirus	*Epomops franqueti*	20	355	2	[43]	[26]
Zaire ebolavirus	*Epomops franqueti*	5	370	2	[43]	[26]
Ebolavirus¶	*Epomops franqueti*	10	27	2	[44]	[26]
Zaire ebolavirus	*Epomops franqueti*	8	17	2	[45]	[26]
Ebolavirus¶	*Epomophorus gambianus*	14	37	2	[44]	[46]
Zaire ebolavirus	*Hypsignathus monstrosus*	9	125	2	[5]	[47]
Zaire ebolavirus	*Hypsignathus monstrosus*	9	44	2	[43]	[47]
Zaire ebolavirus	*Hypsignathus monstrosus*	4	67	2	[43]	[47]
Ebolavirus¶	*Hypsignathus monstrosus*	7	16	2	[44]	[47]
Zaire ebolavirus	*Hypsignathus monstrosus*	4	17	2	[45]	[47]
Zaire ebolavirus	*Micropteropus pusillus*	4	197	2	[5]	[26]
Zaire ebolavirus	*Myonycteris torquata*	19	573	2	[5]	[26]
Zaire ebolavirus	*Myonycteris torquata*	1	323	2	[43]	[26]
Zaire ebolavirus	*Myonycteris torquata*	9	231	2	[43]	[26]
Zaire ebolavirus	*Myonycteris torquata*	4	58	2	[45]	[26]
Zaire ebolavirus	*Rousettus aegyptiacus*	24	307	2	[5]	[48]

Zaire ebolavirus	*Rousettus leschenaultii*	15	141	2	[27]	[26]
Ebolavirus[¶]	*Nanonycteris veldkampii*	1	4	Not seasonal	[44]	[26]
Ebolavirus[¶]	*Epomops buettikoferi*	0	1	NA	[44]	

* based on records for related species in the region. [#]Not seasonal at lower latitudes. [¶] Initial screening results using R-EBOV and Z-EBOV antigen ELISAs are used here. See [44] for further details.

References

1. Hens N., Shkedy Z., Aerts M., Faes C., Van Damme P., Beutels P. 2012 *Modeling infectious disease parameters based on serological and social contact data*. New York, Springer.
2. Begon M., Bennett M., Bowers R.G., French N.P., Hazel S.M., Turner J. 2002 A clarification of transmission terms in host-microparasite models: numbers, densities and areas. *Epidemiol Infect* **129**(1), 147-153.
3. Buhnerkempe M.G., Eisen R.J., Goodell B., Gage K.L., Antolin M.F., Webb C.T. 2011 Transmission shifts underlie variability in population responses to Yersinia pestis infection. *PloS one* **6**(7), e22498.
4. Blower S.M., Dowlatabadi H. 1994 Sensitivity and Uncertainty Analysis of Complex-Models of Disease Transmission - an Hiv Model, as an Example. *International Statistical Review* **62**(2), 229-243.
5. Pourrut X., Souris M., Towner J.S., Rollin P.E., Nichol S.T., Gonzalez J.P., Leroy E. 2009 Large serological survey showing cocirculation of Ebola and Marburg viruses in Gabonese bat populations, and a high seroprevalence of both viruses in Rousettus aegyptiacus. *BMC infectious diseases* **9**, 159. (doi:10.1186/1471-2334-9-159).
6. Okia N.O. 1974 Breeding in Franquet's bat, Epomops franquetti (Tomes), in Uganda. *J Mammal* **55**(2), 462-465.
7. Bradbury J.W. 1977 Lek mating-behavior in hammer-headed bat. *Zeitschrift fur Tierpsychologie-Journal of Comparative Ethology* **45**(3), 225-255.
8. Swanepoel R., Smit S.B., Rollin P.E., Formenty P., Leman P.A., Kemp A., Burt F.J., Grobbelaar A.A., Croft J., Bausch D.G., et al. 2007 Studies of reservoir hosts for Marburg virus. *Emerging infectious diseases* **13**(12), 1847-1851.
9. Amman B.R., Carroll S.A., Reed Z.D., Sealy T.K., Balinandi S., Swanepoel R., Kemp A., Erickson B.R., Comer J.A., Campbell S., et al. 2012 Seasonal pulses of Marburg virus circulation in juvenile Rousettus aegyptiacus bats coincide with periods of increased risk of human infection. *PLoS Pathog* **8**(10), e1002877. (doi:10.1371/journal.ppat.1002877).
10. Towner J.S., Amman B.R., Sealy T.K., Carroll S.A., Comer J.A., Kemp A., Swanepoel R., Paddock C.D., Balinandi S., Khristova M.L., et al. 2009 Isolation of genetically diverse Marburg viruses from Egyptian fruit bats. *PLoS Pathogens* **5**(7), e1000536.
11. Towner J.S., Pourrut X., Albarino C.G., Nkogue C.N., Bird B.H., Grard G., Ksiazek T.G., Gonzalez J.P., Nichol S.T., Leroy E.M. 2007 Marburg virus infection detected in a common African bat. *PloS one* **2**(1), e764.

12. Wright G.S. 2009 Hipposideros caffer (Chiroptera: Hipposideridae). *Mammalian Species* **845**, 1-9.

13. Cotterill F.P.D., Fergusson R.A. 1999 Reproductive ecology of Commerson's leaf-nosed bats Hipposideros commersoni (Chiroptera : Hipposideridae) in South-Central Africa: interactions between seasonality and large body size; and implications for conservation *South African Journal of Zoology* **34**(2), 53-63.

14. Hickey M.B.C., Dunlop J.M. 2000 Nycteris grandis. *Mammalian Species* (632), 1-4.

15. Bergmans W. 1979 Taxonomy and zoogeography of the fruit bats of the Peoples Republic of Congo, with notes on their reproductive biology (Mammalia, Megachiroptera). *Bijdragen Tot De Dierkunde* **48**(2), 161-186.

16. Brosset A., Girons H.S. 1980 Breeding cycles of the microchrioptera living in caves in north eastern Gaboon. *Mammalia* **44**(2), 225-232. (doi:10.1515/mamm.1980.44.2.225).

17. Yuan J., Zhang Y., Li J., Zhang Y., Wang L.F., Shi Z. 2012 Serological evidence of ebolavirus infection in bats, China. *Virol J* **9**, 236. (doi:10.1186/1743-422X-9-236).

18. Sandhu S., Gopalakrishna A. 1984 Some observations on the breeding biology of the Indian fruit bat, Cynopterus sphinx (Vahl) in central India. *Current Science* **53**(22), 1189-1192.

19. Krishna A., Dominic C.J. 1983 Reproduction in the female short-nosed fruit bat Cynopterus sphinx Vahl. *Periodicum Biologorum* **85**(1), 23-30.

20. Lin A.Q., Jin L.R., Shi L.M., Sun K.P., Berquist S.W., Liu Y., Feng J. 2011 Postnatal development in Andersen's leaf-nosed bat Hipposideros pomona: flight, wing shape, and wing bone lengths. *Zoology* **114**(2), 69-77. (doi:10.1016/j.zool.2010.11.006).

21. Richardson E.G. 1977 Biology and evolution of reproductive cycle of Miniopterus schreibersii and M australis (Chiroptera Vespertilionidae). *Journal of Zoology* **183**(NOV), 353-375.

22. Deanesly R. 1939 Observations on pregnancy in the common bat (Pipistrellus pipistrellus). *Proceedings of the Zoological Society of London Series a-General and Experimental* **109**, 57-U12.

23. Taniguchi S., Watanabe S., Masangkay J.S., Omatsu T., Ikegami T., Alviola P., Ueda N., Iha K., Fujii H., Ishii Y., et al. 2011 Reston ebolavirus antibodies in bats, the Philippines. *Emerging infectious diseases* **17**(8), 1559-1560.

24. Heideman P.D., Utzurrum R.C. 2003 Seasonality and synchrony of reproduction in three species of nectarivorous Philippines bats. *BMC ecology* **3**, 11. (doi:10.1186/1472-6785-3-11).

25. Furey N.M., Mackie I.J., Racey P.A. 2011 Reproductive phenology of bat assemblages in Vietnamese karst and its conservation implications. *Acta Chiropterologica* **13**(2), 341-354. (doi:10.3161/150811011x624811).

26. Nowak R.M., Kunz T.H., Pierson E.D. 1994 *Walker's Bats of the World*. Baltimore, The Johns Hopkins University Press.

27. Olival K.J., Islam A., Yu M., Anthony S.J., Epstein J.H., Khan S.A., Khan S.U., Crameri G., Wang L.F., Lipkin W.I., et al. 2013 Ebola virus antibodies in fruit bats, bangladesh. *Emerg Infect Dis* **19**(2), 270-273. (doi:10.3201/eid1902.120524).

28. Jin L., Lin A., Sun K., Liu Y., Feng J. 2010 Postnatal growth and age estimation in the ashy leaf-nosed bat, Hipposideros cineraceus. *Acta Chiropterologica* **12**(1), 155-160. (doi:10.3161/150811010x504653).

29. Ho Y.Y., Lee L.L. 2003 Roost selection by Formosan leaf-nosed bats (Hipposideros armiger terasensis). *Zoological science* **20**(8), 1017-1024.

30. Lin A.-Q., Jin L.-R., Liu Y., Sun K.-P., Feng J. 2010 Postnatal growth and age estimation in Horsfield's leaf-nosed bat Hipposideros larvatus. *Zoological Studies* **49**(6), 789-796.

31. Rossiter S.J., Ransome R.D., Faulkes C.G., Le Comber S.C., Jones G. 2005 Mate fidelity and intra-lineage polygyny in greater horseshoe bats. *Nature* **437**(7057), 408-411. (doi:10.1038/nature03965).

32. Angell R.L., Butlin R.K., Altringham J.D. 2013 Sexual segregation and flexible mating patterns in temperate bats. *PloS one* **8**(1). (doi:10.1371/journal.pone.0054194).

33. Heideman P.D., Utzurrum R.C.B. 2003 Seasonality and synchrony of reproduction in three species of nectarivorous Philippines bats. *BMC ecology* **3**(11 Cited January 8, 2004).

34. Heideman P.D., Powell K.S. 1998 Age-specific reproductive strategies and delayed embryonic development in an old world fruit bat, Ptenochirus jagori. *J Mammal* **79**(1), 295-311. (doi:10.2307/1382866).

35. Heideman P.D. 1989 Delayed development in Fischer pygmy fruit bat, Haplonycteris fischeri, in the Philippines. *Journal of Reproduction and Fertility* **85**(2), 363-382.

36. Heideman P.D., Heaney L.R. 1989 Population biology and estimates of abundance of fruit bats (Pteropodidae) in Philippine submontane rainforest. *Journal of Zoology* **218**, 565-586.
37. Francis C., Rosell-Ambal G., Tabaranza B., Heaney L., Molur S., Srinivasulu C. 2008 Pipistrellus javanicus. In *IUCN Red List of Threatened Species* (2013.2 ed, IUCN.
38. Medway L. 1971 Observations of social and reproductive biology of bent winged bat Miniopterus australis in northern Borneo. *Journal of Zoology* **165**(OCT), 261-&.
39. Gould E. 1978 Rediscovery of Hipposideros ridleyi and seasonal reproduction in Malaysian bats. *Biotropica* **10**(1), 30-32. (doi:10.2307/2388101).
40. Zubaid A., Davison G.W.H. 1987 A comparative study of the baculum in peninsular Malaysian Hipposiderines. *Mammalia* **51**(1), 139-144. (doi:10.1515/mamm.1987.51.1.139).
41. Hayman D.T., Emmerich P., Yu M., Wang L.F., Suu-Ire R., Fooks A.R., Cunningham A.A., Wood J.L. 2010 Long-term survival of an urban fruit bat seropositive for Ebola and Lagos bat viruses. *PLoS One* **5**(8), e11978. (doi:10.1371/journal.pone.0011978).
42. Hayman D.T.S., McCrea R., Restif O., Suu-Ire R., Fooks A.R., Wood J.L.N., Cunningham A.A., Rowcliffe J.M. 2012 Demography of straw-colored fruit bats in Ghana. *J Mammal* **93**(5), 1393–1404.
43. Pourrut X., Delicat A., Rollin P.E., Ksiazek T.G., Gonzalez J.P., Leroy E.M. 2007 Spatial and temporal patterns of Zaire ebolavirus antibody prevalence in the possible reservoir bat species. *The Journal of infectious diseases* **196 Suppl 2**, S176-183. (doi:10.1086/520541).
44. Hayman D.T., Yu M., Crameri G., Wang L.F., Suu-Ire R., Wood J.L., Cunningham A.A. 2012 Ebola virus antibodies in fruit bats, Ghana, West Africa. *Emerging infectious diseases* **18**(7), 1207-1209. (doi:10.3201/eid1807.111654).
45. Leroy E.M., Kumulungui B., Pourrut X., Rouquet P., Hassanin A., Yaba P., Delicat A., Paweska J.T., Gonzalez J.P., Swanepoel R. 2005 Fruit bats as reservoirs of Ebola virus. *Nature* **438**(7068), 575-576. (doi:10.1038/438575a).
46. Thomas D.W., Marshall A.G. 1984 Reproduction and growth in 3 species of West African fruit bats. *Journal of Zoology* **202**(FEB), 265-281.
47. Langevin P., Barclay R. 1990 Hypsignathus monstrosus. *Mammalian Species* **357**, 1-4.
48. Amman B.R., Carroll S.A., Reed Z.D., Sealy T.K., Balinandi S., Swanepoel R., Kemp A., Erickson B.R., Comer J.A., Campbell S., et al. 2012 Seasonal pulses of Marburg virus circulation in juvenile Rousettus aegyptiacus bats coincide with periods of increased risk of human infection. *PLoS pathogens* **8**(10). (doi:10.1371/journal.ppat.1002877).