***Supplemental Table A: Variables, calculations and equations included in the model on the risk of human rabies infection associated with dog-trade in Ghana and Nigeria***

|  |  |  |
| --- | --- | --- |
| **Variable Description** | **Variable** | **Equations** |
| Number of dogs protected by vaccination | BdVstatus | Binomial (x= TrVol or Exvol X Fractionvacc, p=Efficacy) |
| Number of Butchers unprotected by post-exposure vaccination | Butvuln | Butpop -Binomial(x= Butchers x Fractionvacc, p=Efficacy ) |
| Rate of bites per working week per butcher | Ratebite | Γ(α=Bites, λ= person-time) |
| Rate of wounds per working week per butcher | Ratewound | Γ (α=wound contacts, λ=person-time) |
| Total number of slaughtered dogs | Svol | TrVol + ExVol |
| Eq-A.1: Number of infected dogs |  | *P*infIC x(TrVol – BdVstatus) |
| Eq- A.2: Number of infected cross-border dogs |  | *P*infCB xExVol – BdVstatus |
| Eq-A.3: Total number of infected dogs |  | *P*infIC x (TrVol – BdVstatus) +*P*infCB x (TrVol – BdVstatus) |
| Eq-A.4: Probability of rabies virus transmission from at least one bite in a year | P infection>0, bite | 1-exp(-(*P*infIC x (TrVol/ButPop)) xRatebite x InfRiskbite)) |
| Eq-A.5: Probability of rabies virus transmission from at least one wound contact in a year | P infection>0,wound | (1-exp(-(*P*infICB x (ExVol/ButPop)) xRatewound x InfRiskwound )) |
| Eq-A.6: Total probability of rabies virus transmission at least once during butchering activities | P*infection* | P infection>0,bite&wound=P infection>0,bitex P infection>0,wound  P*infection*=P infection>0,bite+ P infection>0,wound-P infection>0,bite&wound |
| Eq-A.7: Number of bites, wounds and bites & wound infections | Ntotal | Binomial(x= Butvuln, p= P*infection*) |
| Eq-A.8: Total probability of rabies virus transmission at least once during butchering activities after a mitigation impacting infection risk (PPE, PEP, education) | Pinfection ,Mit | Pinfection>0,bite = (1-exp(-((*P*infIC x TrVol/ButPop)+(*P*infICB x ExVol/ButPop)) xRatebite x InfRiskbite ) x (1-MitigationUse\*MitigationEffect)  P infection>0,wound = (1-exp(-((*P*infIC x TrVol/ButPop)+(*P*infICB x ExVol/ButPop)) xRatewound x InfRiskwound ) x (1-MitigationUse\*MitigationEffect))  P infection>0,bite&wound,=P infection>0,bitex P infection>0,wound  P*infection,Mit*=P infection>0,bite+ P infection>0,wound-P infection>0,bite&wound |
| Eq-A.9: Cases after mitigation | Ntotal,Mit | Binomial(x= Butvuln, p= P*infection,Mit* ) |

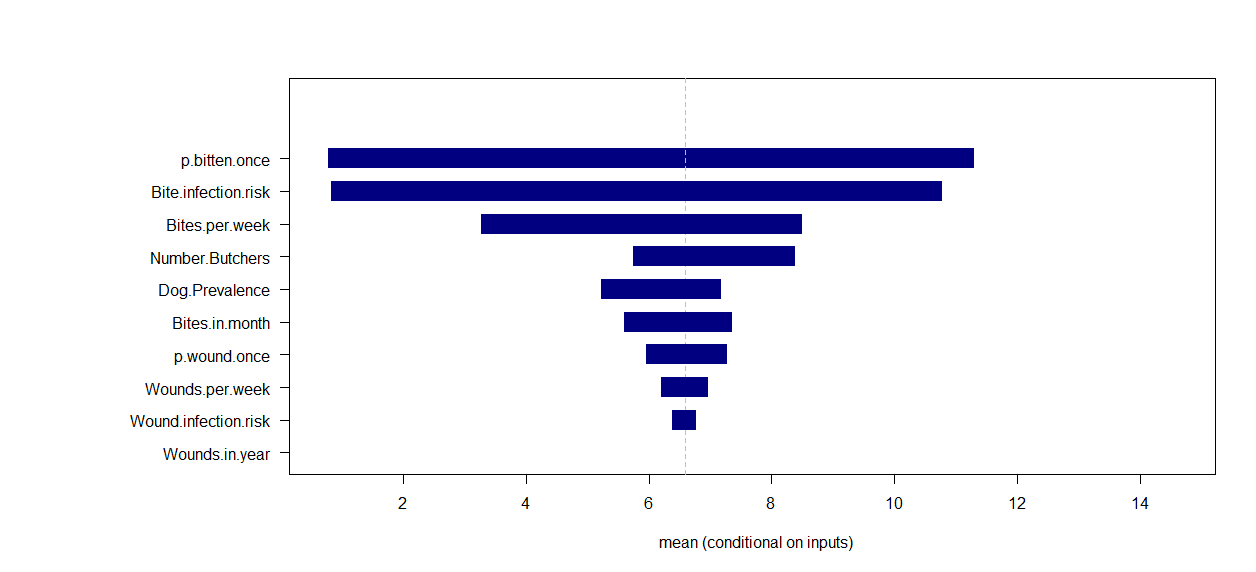
**KEY**

***P*infIC = probability of infected In-country dogs, TrVol = trade volume, BdVstatus = Baseline dog vaccination status, Svol = Slaughter volume, *P*exp bite = probability of exposure via bite, *P*exp Wound = probability of exposure via wound, *P*exp bite & Wound = probability of exposure via bite & wound,** Ratebite **= rate of bite infection,** InfRiskbite **= infection risk due to bite exposure,** Ratewound **= rate of wound infection,** InfRiskwound **= infection risk due to wound exposure, *P*infCB = probability of infected Cross-border dogs, ExVol = Export volume, ButPop = Butcher population,** Butvuln **= Vulnerable butcher population, Mitigation use = application of mitigation measures, Mitigation efficacy = efficacy of individual mitigation,** Fractionvacc = **proportion of vaccinated dog population,** P*infection =* **Probability of butcher infection before mitigations,** Ntotal = **Total number of butcher infection before mitigations,** Pinfection ,Mit = **Probability of rabies infection after implementation of mitigations, Ntotal,Mit = Total number of butcher infection after implementation of mitigation.**

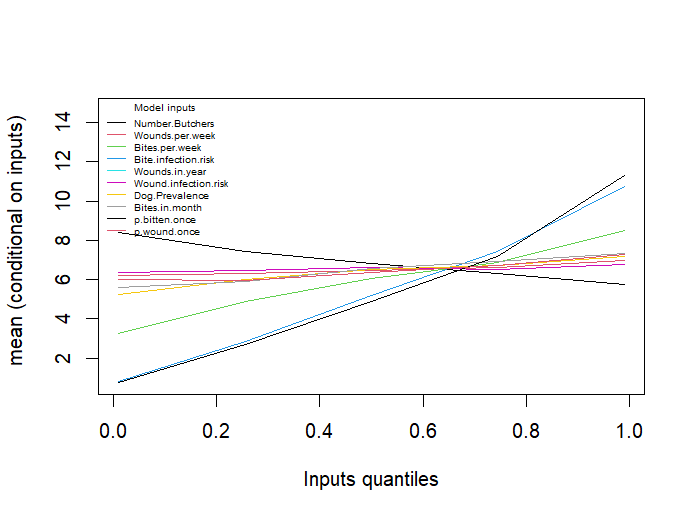
***Supplemental Table B: A checklist of questions used for field survey on the risk of human rabies infection associated with dog-trade in Ghana and Nigeria***

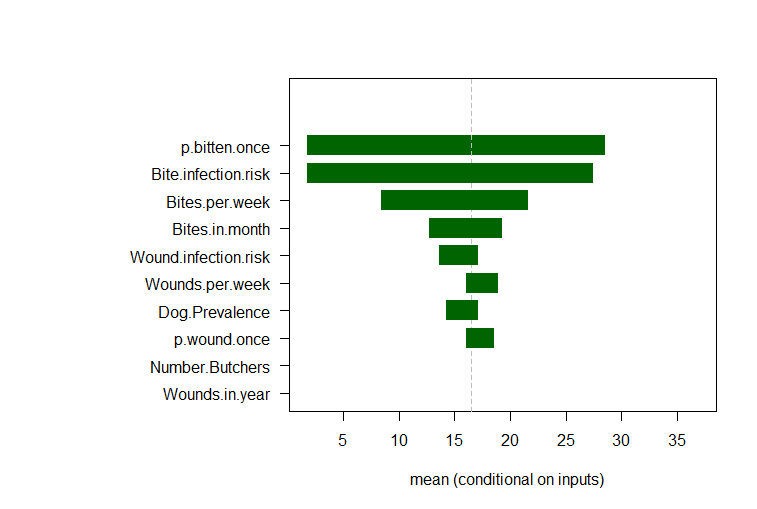
|  |  |  |  |
| --- | --- | --- | --- |
| **S/N** | **Questions** | **Tick** | **Comments** |
| 1 | How many dog markets are there in Nigeria? |  |  |
| 2 | What is the volume of dog slaughter daily? |  |
| 3 | What is the volume of dog slaughter weekly? |  |
| 4 | What is the volume of dog slaughter monthly? |  |
| 5 | What is the volume of imported dogs into Nigeria? |  |
| 6 | from which country? |  |
| 7 | what are the routes of entry? |  |
| 8 | how are the dogs collected and distributed in-country? |  |
| 9 | What is the volume of dogs sourced locally? |  |
| 10 | What is the approximate number of dog butchers in the country? |  |
| 11 | How often do you get bitten in the course of duty per week? |  |
| 12 | What do you do to avoid being bitten? |  |
| 13 | How often do you sustain wounds from any cause per week? |  |
| 14 | When you get bitten, what do you do? |  |
| 15 | When you have wounds on body parts do you cover it up? |  |
| 16 | Do you wear PPE (gloves, mask, coveralls, boots) while working? |  |
| 17 | How many butchers are here in this market? |  |
| 18 | Have you heard about rabies? |  |
| 19 | What do you think it is? |  |
| 20 | Can you identify a rabid animal? |  |
| 21 | Have you taken anti rabies vaccination before? |  |
| 22 | Do you eat with your hands while working? |  |

**Fig. A.1: Tornado plot showing sensitivity of model parameters - Ghana**

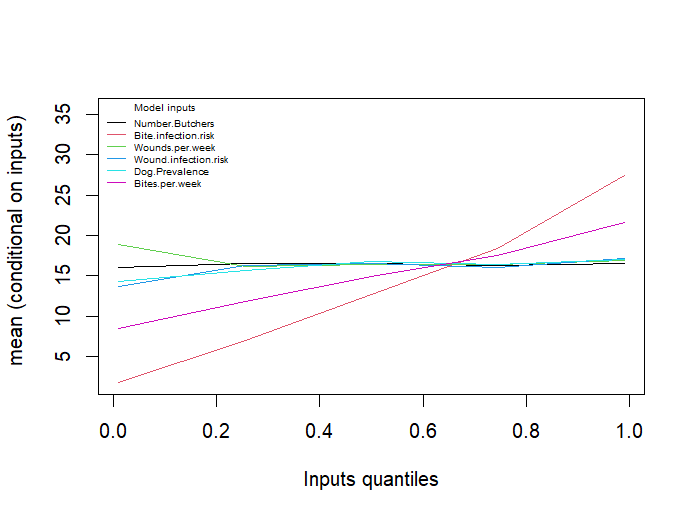


**Fig. A.2: Spider plot showing sensitivity of model parameters - Ghana**





**Fig. B.1: Tornado plot showing sensitivity of model parameters - Nigeria**



**Fig. B.2: Spider plot showing sensitivity of model parameters - Nigeria**