A novel dose-response model for infection with ciprofloxacin-resistant *Campylobacter*

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The objective:

- Innovative dose-response models (DRMs) are needed for emerging infections, like those with antimicrobial resistance (AMR)
- We applied a novel model (below) to the case of ciprofloxacin-resistant (CIPR) *Campylobacter*
- Developed for "Farm-to-fork QMRA of ciprofloxacin-resistant *Campylobacter* from chicken meat in Canada" [oral pres.]
- **Evaluated usefulness and practicability** of the model and the case test

Novel model from Chandrasekaran & Jiang [1]:

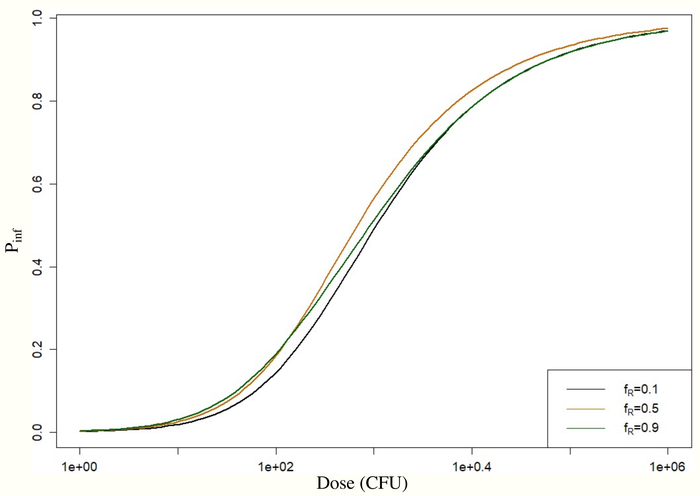
$$P_{inf} = 1 - \left(1 + \left(\frac{d(1-f_R)}{\beta_S}\right)\right)^{-\alpha_S} \times \left(1 + \left(\frac{df_R}{\beta_R}\right)\right)^{-\alpha_R}$$

Data used to construct the new model:

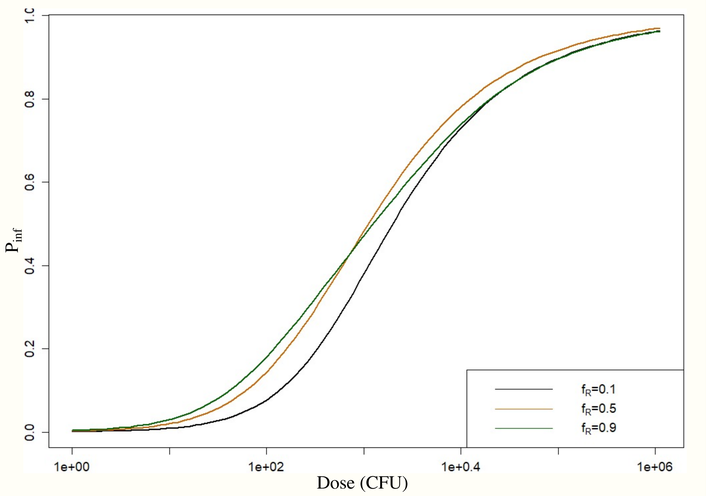
Parameter	Value	Description	Source
(α_R,β_R)	(0.21, 59.59)	Resistant parameters	[2]
f_R	0.1, 0.5, 0.9	Fraction of exposure resistant	--
t_{fs}	4 days	Last day of first symptoms	[3]
k_{max}	8.4 h^{-1}	Max. kill rate of drug	[4]
EC_{50}	0.0035 mg	Conc. for half of max. effect	[4]
C	6.5E-5, 1.95E-4, 3.25E-4 mg/L	Drug conc. in body	--

Use… $C, k_{max}, EC_{50}, t_{fs}$ → To find… (α_S,β_S) → Used with… $(\alpha_R,\beta_R), f_R$ → To find… P_{inf}

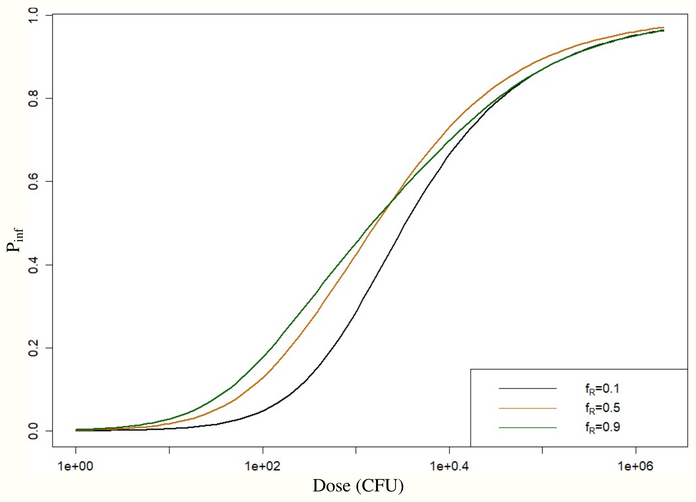
At C = 6.5E-5 mg/L:



At C = 1.95E-4 mg/L:



At C = 3.25E-4 mg/L:



Takeaways:

- Use of drug conc. in the body may limit applicability
- Data for model can be hard to find; several assumptions had to be made
- Application to other big-drug combos would be interesting
- Validation against real-world data needed

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