



A Zombie Apocalypse...?

TakeAIM Winner 2018:
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It's a normal weekday evening. You flip over the channel to catch the news and start to stretch out, but freeze mid-motion.

"Outbreak...spreading fast...biting...not safe..."

You glance over at the ironic Zombie Apocalypse Survival Guide sitting on your shelf and swallow hard.

The news blurs in front of you, but you make out the key points. Scientists are developing a cure while statisticians are desperately estimating the growth rate of the outbreak: How fast is the disease spreading? Can we control it? Could we eliminate it completely? Your heart starts to race. Your palms sweat...

Now we may not actually be living during a zombie apocalypse, but infectious diseases were still the cause of 17% of deaths worldwide in 2013, remaining a leading cause of mortality. Across the world there are health professionals and researchers asking exactly the same questions as the zombie-fighting statisticians, but for a range of different diseases and settings.

My research combines data with equations that describe how some of these diseases are transmitted, aiming to predict outcomes and guide policy. For example, by considering the villages affected during the first 2018 DRC Ebola outbreak as interacting populations, we estimated the probability of disease spreading to the major capital, Kinshasa, before it had been controlled.

Focusing on diseases that affect tropical developing countries, I use mathematical models to simulate the impact of different measures on transmission and investigate how we can best allocate resources as we drive these diseases towards extinction.

The Smith Institute, enabled by the generous sponsorship of our leading corporate partners, ran the TakeAIM competition in 2018 to make visible the crucial role that mathematics will increasingly play in all aspects of our lives. The competition was open to undergraduate and postgraduate students working in the mathematical sciences. First prize was £1,250 of Apple vouchers, with nine runners-up each receiving £100 of Amazon vouchers.

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