

The Zombie Condition in Literature

[Announcer] This program is presented by the Centers for Disease Control and Prevention.

[Sarah Gregory] Hi, I'm Sarah Gregory.

[Deanna Altomara] And I'm Deanna Altomara.

[Sarah Gregory] And today we're talking with Drs. Joanna Verran and Xavier Aldana Reyes about their article on literature and the zombie condition. They're calling from the UK. Welcome, Dr. Verran and Dr. Aldana Reyes.

[Joanna Verran] Delighted to be here, thank you.

[Xavier Aldana Reyes] Thank you.

[Sarah Gregory] You give the definition of a zombie as a relentlessly aggressive human or reanimated human corpse, driven by biologic infections. Okay, so I just want to be clear here. Zombies don't really exist, do they?

[Xavier Aldana Reyes] Well, if you were to see me at the end of term. . . [laughter] But, no, to my knowledge they don't quite exist as we see them on TV, do they, Jo?

[Joanna Verran] No, I don't think so.

[Sarah Gregory] Well, personally, I'm very glad to hear it.

[Deanna Altomara] Your article is based off your work with the Bad Bugs Bookclub. So, what is this club and how did it get started?

[Joanna Verran] Okay, well, I set up the Bad Bugs Bookclub. I set it up in 2009. So it's been going quite a long time. And if you look on the website, you'll see that there's information of about 50 different books that we've read. And you can get information, reading guides about it, and also information about the different discussions we've had about the books.

But it all started, really, from my teaching, because, as a microbiology teacher, I always felt that it was important that my students didn't just learn about microbiology, but were able to talk about microbiology to other audiences, even their families, so that then, when they went home, they could say what they were studying. So, it's an ability to be able to communicate science to a whole range of different audiences. And I started getting my students, first of all, to use the humanities to communicate their science. And I did a big project with microbiology and art, where I got my microbiology students to create art. And then I thought, actually, literature is something which was very accessible to everybody. And I thought about using fiction where infectious disease was part of the plot, as a vehicle for talking about disease epidemiology and transmission. And, really, that's how it began.

[Deanna Altomara] Awesome!

[Joanna Verran] And we're still going—10 years next year.

[Deanna Altomara] That's great! At first glance, science and literature seem to be very different fields, so how did the two of you meet?

[Joanna Verran] Well, you'll end up thinking I'm a very strange person, but when I started looking at zombies and them as a model for infectious disease, I talked about my interest with a student who was doing a PhD in math. And he was also interested in zombies as a vehicle, as an agent of disease. And together we developed, well he particularly developed, a package called "SimZombie," which is a game, which you can, which the players can manipulate to show how different monsters can be spread through populations. And one of the ways we had to start up doing this was by getting people, obviously, to pilot this game. And so, we invited people from our university and from outside the university who were interested in vampires, werewolves, and zombies—oh my!—to come and try out SimZombie. And essentially they came and we gave them different scenarios about a monster, like a vampire, and a vampire meeting lots of people. And they had to decide how infectious the vampire was, how hard they would be to kill, how quickly that vampirism would spread. And Xavi was one of the people who came to that meeting. So, he can tell you more about that now.

[Xavier Aldana Reyes] Sure. Well, I joined Manchester Met in 2013 and it wasn't long until I heard about what Jo was doing. I'm a founding member of the Manchester Center for Gothic Studies here, which is the biggest of its kind in the world. So, yes, when I heard that there was all this work being done with zombies and vampires and werewolves and infection, I was immediately attracted to it. I also run a reading group in the summer, that's a contemporary gothic reading group, so it seemed like a perfect occasion to join forces, especially because at that time, Jo was doing a lot of work with zombie fiction, in particular, and I've been interested by zombies for a long time. So, yep, that's how we came together.

[Joanna Verran] And we got on very well. And Xavi's been coming to the, my book club for a while, and he brings a really fantastic different dimension to our discussions. In the book club, we have scientists and nonscientists, you know, and nonacademics, as well, and Xavi brings information about gothics and history and literature. I suppose I bring microbiology, and the nonscientists, nonacademics all bring their expertise of what they've read.

[Sarah Gregory] Where, where is it that you both teach?

[Joanna Verran] Manchester Metropolitan University in the UK.

[Sarah Gregory] Both of you?

[Xavier Aldana Reyes] Yes.

[Joanna Verran] Yes. So, I'm Faculty of Science and Engineering.

[Xavier Aldana Reyes] And I work in the Faculty of Humanities; I work in the English Department.

[Joanna Verran] And they're quite close together, fortunately. So, it's very interdisciplinary research and we have to explain to one another, quite carefully, about the terminology that we use and what we meant.

[Sarah Gregory] Well, a major challenge in public health is maintaining effective communication, as you were talking about, between scientists and, in this case, the public. Your article describes how science-based book clubs can help improve scientific communication.

From the standpoints of a microbiologist and a literature professor, could you explain how this works?

[Joanna Verran] Yeah, so when we have our book club meetings, there's usually about eight people; say half of them are nonscientists, nonacademics, and some of us are microbiologists and some of us are humanities or academics from a more of an arts-based discipline. And we kind of start by, "Did everyone enjoy the book? Did they like the story? Did they like the characters?" And we talk through, I suppose, the, sort of, the literature aspects of the book. And then we also look at the microbiological aspects of the book, you know, "What disease is being talked about here? How does what we know about this disease relate to the way it's presented in the novel? Is it accurate? Is it inaccurate? I mean, is it made up? Is it fictional? And also, what can we learn from reading these particular books about the epidemiology of real diseases, as might be impacting on us now?" So, we are always conscious in the book club of a world outside where there are diseases and outbreaks and epidemics and pandemics going on. And we do try and bring them into our discussion, and that's often helped.

So, that's the way the book club works, but I think, for me as a microbiologist, what I love about the book club is that everybody is coming into that meeting with something to bring to it. So, it's not the scientists giving a load of stuff about diseases. It's eight people who have read the book, all of whom have got something from it. And there is, there are routes through which you can talk about it. And I think, I think that's how that has worked really well. Sometimes it shows up, perhaps a misunderstanding about a particular, a particular disease or, you know, how a particular disease is spread. And we can talk about it because somebody has sort of asked the question, but it's not some know-all scientist trying to tell, you know, somebody else; it's always a conversation, and I've found that. I've found that a really nice, sort of, level playing field of information to exchange. Don't know about what you think, Xavi?

[Xavier Aldana Reyes] It's fascinating to me, because getting, shall we say, the scientific background to some of these novels, which, as someone who works with literature, you don't necessarily do, it's to me, very, yes, challenging, in a way. Because I don't normally, you know, when I read a novel about the flu, I don't know the history, necessarily, of flu epidemics. And so, finding out whether it's accurate, what the novel takes from it, what it does with it, why it does what it does, it's fascinating. And it gives the whole exchange between the sciences and literature a circular, kind of, shall we say, sphere that otherwise it wouldn't have. So, it isn't just about, you know, what science hides behind the literature, but also how the literature then informs science, in turn. So, yeah, it becomes about how, a matter of representation, but also a matter of how literature provides narratives or models that then science can use. For example, the CDC prevention, or zombie preparedness blog, that shows that scientists also are borrowing from popular culture. So, yes, I think everyone wins.

[Sarah Gregory] So, you two coined the phrase "emerging infectious literature," I think you've already kinda been talking about this. But talk to us a little bit more about that.

[Joanna Verran] So, when I was teaching, I think it was, well it was in the 1990s, that the term "emerging infectious disease" arose. And I think it had been noticed at that time that there have been, since the 1970s, that there have been new diseases. So, whereas before that it was really like, "Oh, you know, infectious disease is sewn up. We've got antibiotics. We've got vaccines. You know, everything is wonderful." And then, various other new diseases were emerging—I

mean HIV, particularly, *e coli* O157, there were, you know, there were several...typhus e. And that term “emerging infectious disease” was used, was used to describe what was going on. I mean, we’ve got a journal of it now, obviously, as well. And I used to teach, I used to teach about that because I used it to, I mean I think it’s amazing, it just shows how dynamic microbiology is as a subject. And when you’re teaching it, you obviously need to teach the students about what to learn that isn’t known yet, or how to learn what isn’t known yet, by...in your teaching. So, the term was very familiar to me. And I think ‘cause Xavi and I were talking about the books and the books that we’ve read, it sort of became apparent to us, as well, that, you know, there are more novels now about influenza, because of the scare about influenza. You know, there are, there are certain diseases that we read novels about now that weren’t written about before. So, it was like the literature was reflecting the emerging infectious diseases. So, the literature itself is emerging.

[Deanna Altomara] Dr. Aldana Reyes, as a literature professor, what are the big metaphors or themes that occur to you when you read about a zombie?

[Xavier Aldana Reyes] Well, there are many. There is something inherently about the zombie, you know, to do with both possession and dispossession that is really interesting. And, of course, the zombie has changed quite a lot throughout the last a hundred years or so, from the Haitian folkloric kind of origins, where we’re talking about, a lot more about a possessed corpse, to the more contemporary, biological, kind of, shall we say, rabid human that we see in a lot of contemporary texts. So, that has given rise to a lot of different readings of the zombie. To me, the most interesting ones are the ones that have to do with the body of the zombie. I think the zombie’s the perfect monster for a secular age. You know, he is pure matter driven by instinct. If that’s not a secular reading of the present, then I don’t know what is. But, there’s also a lot to be said about how the behaviors of zombies—you know, the idea of pointless consumption that just repeats itself with no real endpoint—reflects, well certainly neoliberal economic structures. It’s the perfect monster for the recession, I think, you know, concerns about overpopulation. All of that is there, either explicitly or implicitly, in popular zombie text.

And the other thing I like about zombies is the idea of the sympathetic zombie. We seem to have gone past the point where zombies were the ultimate point in objection. And that kind of objection is being turned inside out and turned into something to care about, to perhaps understand. So, we no longer necessarily engage with monsters in the same way we used to before. So, you know, the idea of pure evil is no longer in; we’re much more interested in the construction of evil, how do people become evil, so to speak. But also, is there sympathy for the monster, can we love the zombie? And so you’ve got zombie romances where the, shall we say, what used to be discussed is turned on its head, and it becomes something to pity, understand, and value. So, as in *Warm Bodies*, the zombie can be loved back to life, which I think is a really, really interesting notion that is very contemporary. They really are great models for social exclusion, marginalization, and other forms of, you know, cultural exclusion.

[Sarah Gregory] This is actually very interesting. Just recently we did a podcast on the ethics of and of the stigmatization of carriership and people carrying disease that weren’t really infected, and how they’re stigmatized by it. So, this actually sort of plays into that, what you’re talking about.

[Deanna Altomara] Yeah, those are all really fascinating points. And how about you, Dr. Verran, how are zombies often used as metaphors for infectious disease?

[Joanna Verran] Well, as I said before, I think the obvious, the obvious example is, you know, if you are attacked by a zombie, typically you become a zombie, so there is this transmissibility of infection. I think you can then also look at certain texts about zombies and get a bit more information. So, *World War Z*, particularly, is a fantastic resource about zombies. And they talk about it from a political, biological, geographical viewpoint—it's a fabulous book. And they explain it, and they try and explain how quickly, how long incubation period is. And I think all of those kind of...you can dig into some books and find a little bit about, you know, incubation periods, and so you can get some idea of the epidemiology of a particular type of zombie infection, in a different kind of novel, because of course, as we said, they are all fiction.

But the zombie also is a sort of a visible embodiment of, essentially, an invisible agent. So, in many cases now, it's some sort of biological infection, a microbiological infection, and in many cases, it's a virus. So, lots of different zombie books have virus infections to start with, so, and you can't see those. So the zombie does allow a kind of really rapid visualization of the spread of a condition through a population, obviously faster than one would normally expect. I mean, when you look, when you look at, say, *Day of the Dead*, the zombies really aren't doing very much at all; they sort of lumber around a bit. But in *28 Days Later*, they are really, really quick incu..., you know, incubation period, and they also move really fast. So, the epidemiology of that disease is changing because the zombies can run, whereas beforehand, you know, you could quite easily avoid a zombie if you ran, because they couldn't. So, the zombie epidemiology, again, has also changed and evolved over time to speed up, I think. It's been said speeding up with today's society, that the zombies move fast, because so does everything in society.

So, I think, I was talking to Xavi earlier, you know, people used to be sort of, you know, frightened about ghosts or frightened of, you know, other gothic figures. But, in a way, now we're quite frightened about infectious diseases, you know, the new...what's going to be the next influenza pandemic, what's going to be the next disease apocalypse? And the zombie actually allows you to kind of explore it, really, because the way that the zombie's described, the way the diseases progress, and also, how the surviving populations behave. How do they contain, or can they contain the infected? Can they prevent the infection spreading...can they control it? How do they...can they kill it, can they inactivate it? So, the zombie does allow you to explore aspects of the epidemiology of disease, in a, in a, obviously in a fictional way, but you get a lot of freedom that way, as well. So, they've been very useful in that sense.

[Deanna Altomara] So, in your article, you discuss how zombie infections often resemble real-life infections. So, Dr. Verran, would you be able to give us a few examples of this?

[Joanna Verran] Yeah. I think, if you look at, first of all, if you look at routes of transmission, then mainly the infection by zombie is through puncture. So, rabies is, say, one of the most obvious routes of infection for that. And in *World War Z*, they talk about, you know, the nearer to the brain the bite is, the shorter the incubation period, which is, you know, which is also talked about with rabies. And there are also infections of zombieism in *World War Z*, produced through transplants, as well. So, you know, that's one example about transmission. In terms of the symptoms, the behavior, obviously, looks at affecting the brain. And things, various prion diseases or toxoplasmosis, perhaps, are diseases which can affect brain behavior, and also rabies,

to some extent, as well. And I think some of the symptoms of zombie infections are more like sort of rotting bodies, so again, it's more like, I suppose, gangrene, pus, septic infections, that sort of thing. But that's more of a general deterioration of the body. Again, in *World War Z*, I think in the end, the zombies just rot away, 'cause there's nothing really left of them, because they, actually, having had whatever the infection was, they then get bacterial infections and they rot away until they can't move anymore. The epidemiology of a zombie infection is also quite interesting, because you can look at, you know, essentially, it's disease by transmission through contact, so something contemporary. You could look at Ebola, because of the outbreaks there, you know, you have to have quite close contact to be infected. So, again there are diseases and you can bring in different epidemiologies, as necessary.

A couple of books recently have looked at a fungal agent for zombieism, so *The Girl with All the Gifts* by M.R. Carey. In that case, it's fungal. And there is an episode, later in the book, where there is a release of fungal spores. That then turns it into an airborne type of infection, which you can, I suppose, relate more to in some sorts of viral infections. So, yeah, what we try and do is sort of bring together all the information that we have, from the novel that we're reading, and from the background information we have, and through contemporary epidemiology, to see what, you know, what we can learn from the reading. So, yeah, there's quite a few examples.

[Sarah Gregory] So, sort of continuing on with what you were just saying, a lot of the zombie infections we see in the media appear to be rooted in science. For example, many describe the virus's biological effects on the brain, as you were talking about. Do these descriptions use real-life science more accurately, or are they mostly just sort of made-up words and concepts?

[Joanna Verran] I think many of the authors that, or some of the authors that we've read—I know Xavi's looked at them, as well—you know, they certainly use their inspiration from science and they also research into science, as well. So, you know, it's not, it's not made up; there is an underpinning and an inspiration, if not a literal translation. I mean, if you look at current things, there was the zombie anth...you know, the anthem, infected with a fungus and then they start to behave like zombies. And so, you know, there are some real-life science, and in fact, you know, in many books, there is a lot of science that we can read. And some novels are quite keen on like techno-science, so you know, you get a page and a half about how to use a scanning electron microscope...a transmission electron microscope, and for some that's interesting, and for others, perhaps less so, so, there are different styles of writing. And what the book...what we do in the book club, we try and pick it apart, really, and, you know, see what's...you know, see where the science is, and see how well the science reflects real-life science. And some of the books that we have read, I haven't produced reading guides for, because we didn't really feel that, in the book there was enough for somebody to get any sort of academic infectious disease information out. For example, *The Strain* by al Toro...Guillermo del Toro, so, and somebody else...

[Xavier Aldana Reyes] Chuck Hogan.

[Joanna Verran] Chuck Hogan. So, although it was an exciting for the vampire thing, it really didn't, we didn't really feel that it had enough science in. Yeah. Xavi?

[Xavier Aldana Reyes] And we do see, what we do see, as Jo was saying, is a lot more scientists writing creatively. I mean, Jo herself is a creative writer. So...

[Joanna Verran] Trying, trying.

[Xavier Aldana Reyes] I think there is an interest in literature as a channel for, at least partly, for science. And there are some novels, like *The Zombie Autopsies*, which we write about in the article, by Steven Schlossman. Now, Steven himself is a psychiatrist, you know, so that all the science there about the brain and the way that it decays, obviously has a scientific background, and that's fascinating. This is where, you know, the book club really helps us come to terms with the science behind the novels, but also the inspiration for the novels. You know, why write a novel about the decay of the brain after a zombie invasion. And what we see as well, interestingly, is, you know, things happening the other way around, where neuroscientists, for example, will use zombie metaphors as a way of talking about neurology and the way that the brain functions. It's incredibly interesting and it's really quite difficult to extricate the science from the fiction.

[Joanna Verran] One is inspiration for the other, I think you could say.

[Sarah Gregory] So, Dr. Aldana Reyes, the undead have been appearing in books and stories for thousands of years. Tell us a little bit more about the history of their places in literature.

[Xavier Aldana Reyes] So, it's interesting because ghosts, of course, go back to, you know, oral history. The first recorded instance of the word, I think it's "ghost" or "apparition" being used, if I'm not misremembering, is as far back as the eighth century. And they have, obviously, been used in different ways. You know, people were really scared of vampires, at one point, of the dead returning. Now, what's interesting is that most gothic monsters are some form of undead, either the dead returning or the dead coming back to life. In the case of the zombie, it's a very, very interesting example of a monster that's changed quite radically throughout the twentieth century. As I said, if you go back to its origins in the West Indies, in folklore, we're talking about very much, you know, possession type of zombies, sort of voodoo zombies. But that changes radically in the 60s with George Romero and his *Night of the Living Dead*, and zombies kind of become brain-eating monsters. But it's not really until the 1990s that virology really kicks in with a video game like *Resident Evil*, and then the adaptation in the 2000s. And now they have become eminently viral monsters. So, what's interesting for me is both about the fascination that we have with the undead, which is continuing, certainly not new in nineteenth century, strong in nineteenth century invention, but the fact that they changed the roles that they play culturally, so we now fall in love with vampires, and even zombies, but they might become vectors for other types of social concerns and messages, like virology, or the management of overpopulation, concerns about economy. This is where I find that the gothic is not something of the past, but very much of the present. We keep on rethinking monsters according to the zeitgeist, and that's why, you know, why I find them really interesting.

[Deanna Altomara] Especially since these myths have persisted for so long in human consciousness, why do you think people find zombies so fascinating? This article has generated a lot of press.

[Xavier Aldana Reyes] I think that zombies are so fascinating because, in a way, they are us already. There is a very, very thin line between zombies and humans that's got shorter as they have become rabid humans. We see that, for example, in *28 Days Later*, where some people were complaining the zombies were actually rabid humans. So, they allow us, really, very much to talk about the present, what's happening to us. But they're also a cautionary tale, really, about what could happen tomorrow. And notice that most zombie narratives, they're not, strictly

speaking, horror stories, insofar as they don't focus on the horror of the attack of the zombies. They tend to be longer narratives, especially following *The Walking Dead*. They're stories about survival and about management of people, of resources. And I think they're ultimately tales about climate change, about resources, as I say. They're very much tales of the present and the near future.

[Sarah Gregory] Okay, you may have touched on this earlier, but why exactly did you choose zombie fiction as your theme for your EID article instead of, say, werewolves or vampires, or your long-term study, I guess I should say?

[Joanna Verran] Okay. Well, it's actually quite interesting because, from the book club, the first book that we read that featured monsters, we read *Dracula* by Bram Stoker, was one of the earlier books we read. And it was also at the time that the *Twilight* movies had just come out. And the Manchester Children's Book Festival was started in 2010, I think, and I ran the science corner in that book festival, and chose the *Twilight* novel as the focus for looking at the transmission of infectious diseases, because I thought it was a book that young adults would have read, particularly girls, obviously, I think. So, I had a workshop and I set the workshop in something that looked like a lab—everybody who came in had to put lab coats on—because where the two protagonists first meet. They meet in a biology lab, studying the cell cycle. So, we had slides there so they could look at the cell cycle. And then we talked about what it was that made Edward become a vampire in the first place and, you know, why he was turned into one. And it was because he had influenza in 1918. So, he was turned into a vampire to stop him dying of influenza in 1918. And you can explore influenza as a disease, why people are scared of it, how you catch it. Then you can compare it to vampirism, how you catch it, what diseases are transmitted in that way, and you can think about how you would prevent these infections. So how would, if you didn't want to be a vampire, what would you do? You know, say if there's a vampire outside your door and you didn't want to let him in, you know, what would you do? Well, you don't let them in. So, you're modifying your behavior to not expose yourself to that infection, which is actually a way of preventing infectious disease. And things like garlic, you know, they are, you can talk about, you know, prophylaxis, vaccination, prevention. So, you know, even *Twilight* could be in the Bad Bugs Bookclub. So, we started looking at, looking at vampires, and then "SimZombie," as I mentioned earlier, allowed us to explore and compare zombies, vampires, and werewolves as agents of infectious disease. And vampires, as Xavi said, you know, they, apart from usually being quite charismatic these days, they're only active at night and they tend to produce clusters of activity. So, when you read anything about vampires, it tends not to be a plague of vampires, it tends to be something quite localized. So, it's almost like sort of little outbreaks of, you know, venereal disease infection. Werewolves are only active in the full moon, so, and again, they have an even smaller way of spreading...werewolves. And also, werewolves know what they are, so very often you read that werewolves chain themselves up and lock themselves up, so they don't escape and kill people, when it's a full moon, because they know what's going to happen. So, werewolves are quite sentient. Also, quite boring, really, because for 30, you know, 29 days of the month, they don't do anything at all; they're just like normal. But by that sort of monthly appearance, you know, you can think about herpes. So, you know, even vampires and werewolves, you can think about infectious disease, but we chose zombies, I think, for all of the reasons that we've talked about already. You know, they are so much more versatile and they allow you to explore many things, as well as, as well as just viruses and disease.

[Deanna Altomara] And, of course, all of these works are fictional, but they make you wonder, do we really have to worry about a zombie-like apocalypse?

[Xavier Aldana Reyes] As Jo says, obviously, we don't necessarily have to fear zombies directly, in terms of, you know, real zombies. But they are great cautionary tales, as I was saying before, about overpopulation, about climate change. What's interesting about the zombie apocalypse is that, whilst we have, obviously, fantasized about the end of the world for many, many years, novels like *The Last Man* or *The Mummy*, written in the early twentieth century...nineteenth century, sorry...were always fantasizing about really far in the future, you know, 300 years in the future. Whilst now, these apocalypses, they're very close to our own time. We're fantasizing the apocalypse, the end of things, within a hundred years, now, sometimes even like 10 years, or 40 years in the fiction of David Mitchell. So, that tells you something about our vision of the world, dwindling material resources, overpopulation, as I said, and our role within it. So, I think they're great stories in terms of learning about how we manage, you know, the world.

[Joanna Verran] So, perhaps it's not specifically zombies we need to worry about, but, you know, apocalypses, in general.

[Sarah Gregory] Well, on that horrifying note... [laughter] I thank you both, Dr. Verran and Dr. Aldana Reyes, for taking the time to talk with us about this entertaining, but, you know, also very serious topic.

Listeners can read the EID Another Dimension online at cdc.gov/eid.

I'm Sarah Gregory for *Emerging Infectious Diseases*.

[Deanna Altomara] And I'm Deanna Altomara with *Emerging Infectious Diseases*.

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