

Bio & Terror Bible

EXPOSING THE COMING BIO-TERROR PANDEMIC

BIOTERRORBIBLE.COM: [Starting in 1957](#), there have been [18 mainstream movies and documentaries](#) dealing specifically with bio-terror and pandemics. Although these films have been sporadic over the last 55 years, they have intensified over the last 10 and appear to be peaking in 2012 or 2013.

Title: Contagion (Film)

Date: September 9, 2011

Source: [Wikipedia](#)

Abstract: "Contagion" is a 2011 [medical thriller disaster film](#) directed by [Steven Soderbergh](#). The film has an [ensemble cast](#) that includes [Marion Cotillard](#), [Matt Damon](#), [Laurence Fishburne](#), [Jude Law](#), [Gwyneth Paltrow](#), and [Kate Winslet](#).

The film documents the spread of a virus [transmitted](#) by [fomites](#), attempts by medical researchers and public health officials to identify and contain the disease, the loss of social order in a [pandemic](#), and finally the introduction of a [vaccine](#) to halt its spread. Contagion makes use of a "[hyperlink narrative](#)" style popularized in several of Soderbergh's other films to follow several interacting plot lines.

The film had a production budget of \$60 million, and filming took place in countries around the world. It premiered on September 3, 2011, at the [68th Venice Film Festival](#) and was publicly released to critical acclaim on September 9, 2011, in the United States, Canada, Italy, Hong Kong, and four other territories. Contagion grossed an estimated \$135 million worldwide. A number of scientists and science writers have praised the accuracy of the science in the film which received cooperation from the U.S. [Centers for Disease Control and Prevention](#).

Plot

The film follows several interacting plotlines, with no single protagonist, over the course of several weeks from the initial outbreak and attempts to contain it, to panic and decay of social order, and, finally, to the introduction of a vaccine.

After a business trip to Hong Kong, businesswoman Beth Emhoff (Paltrow) stops in Chicago for a [dalliance](#) with a previous boyfriend before returning to her husband and family in suburban Minneapolis. At first she appears to have contracted a [common cold](#) during her trip. Her son, Clark, also becomes symptomatic and is sent home from school. Beth's condition worsens and two days later she collapses with severe seizures in her home. Beth's husband, Mitch (Damon), rushes her to the hospital, but she continues to seize and dies of an unknown virus.

Because it affects the brain and central nervous system, pathologists attribute it to a [meningoencephalitis](#) virus. Mitch returns home and finds that Clark has also died from a similar infection. Mitch is put in isolation but turns out to be genetically immune to the disease. He and his daughter attempt to flee the city, but a military quarantine has been imposed, and they are forced to return to their home to face decaying [social order](#) and rampant looting of stores and homes. Not knowing whether his daughter inherited his immunity, Mitch struggles to balance his teenage daughter's frustration with quarantine with his desire to protect her, while trying to come to terms with his own loss.

In [Atlanta](#), representatives from the [Department of Homeland Security](#) meet with Dr. Ellis Cheever

(Fishburne) of the [Centers for Disease Control and Prevention](#) and express fears that the disease is a [bioweapon](#) intended to cause terror over the [Thanksgiving](#) weekend. Cheever sends Dr. Erin Mears (Winslet), an [Epidemic Intelligence Service](#) officer, to Minneapolis to begin the investigation. In addition to tracing the outbreak back to Beth, Dr. Mears has to negotiate with local bureaucrats reluctant to commit resources. She later becomes infected with the disease after being in contact with contaminated [fomites](#) while staying at her hotel. The [Minnesota National Guard](#) arrives to quarantine the city, and a badly deteriorating Dr. Mears is moved to the field medical station she helped set up, where she later dies.

Investigations into cures via treatment protocols or vaccines initially prove fruitless as scientists cannot find a [culture](#) to grow the new virus, which has been named the Meningoencephalitis Virus One (MEV-1). Professor Ian Sussman ([Elliott Gould](#)) violates orders from a CDC scientist, Dr. Ally Hextall ([Jennifer Ehle](#)), to destroy his samples and identifies a line of bat cells that will support research of a vaccine. At the CDC, Dr. Hextall uses this breakthrough to begin to characterize the properties of the virus, which turns out to have a mix of genetic material from bat, pig and human viruses and appears to spread via [fomites](#) with a [basic reproduction number](#) of two.

A conspiratorially minded freelance internet journalist, Alan Krumwiede (Law), posts video blogs about the disease, and in one of them appears sick and later claims that he recovered using a [homeopathic](#) cure called [forsythia](#). Panicked people attempting to obtain forsythia overwhelm pharmacies and also accelerate the contagion as infected and healthy people congregate. Krumwiede leaps to national attention and, during a television interview, accuses Dr. Cheever of informing friends and family to leave Chicago before a quarantine is imposed. It is later revealed Krumwiede was never sick with the virus but was attempting to boost demand on behalf of investors in the companies producing and distributing the homeopathic treatment. He is arrested for conspiracy and fraud, but is soon released after his 12 million blog readers collect and pay his bail.

Dr. Hextall identifies a potential vaccine, using an attenuated (live) virus. Because of the difficulties of human subjects testing, she follows the precedent of other vaccine researchers and inoculates herself first. Hextall visits her gravely ill father in the hospital to expose herself to the virus and test the vaccine. Production of the vaccine is rapidly ramped up and the CDC awards vaccinations via a random lottery based on birth dates for one full year until every survivor is vaccinated. Dr. Cheever, feeling guilt over his past actions to protect those who are close to him, gives his fast-tracked MEV-1 vaccination to the son of a janitor he works with at the disease center. Dr. Hextall places the surviving samples of the MEV-1 virus in cryogenic storage with [H1N1](#) and [SARS](#).

Dr. Leonora Orantes (Cotillard), a [World Health Organization](#) epidemiologist, travels to Hong Kong to trace the origins of the infections. She collaborates with Sun Feng ([Chin Han](#)) and other local Chinese epidemiologists and public health officials and they identify Emhoff as [patient zero](#). As the virus spreads, Feng kidnaps Orantes to use her as leverage to obtain the first MEV-1 vaccines for his village. Orantes spends months living in rural China with the villagers until the vaccine is announced. Feng exchanges Orantes for the vaccines, which turn out to be [placebos](#). Orantes rushes away when she is informed of this, presumably to warn the village.

The film concludes by tracing the origin of the virus from a bat nesting in a tree being cleared by Emhoff's mining corporation. The bat flies to a nearby [pig sty](#) and drops a banana where it is eaten by the pig, presumably transferring the bat virus into the pig. The pig is sold to and butchered by a chef in a Macau casino who greets Beth Emhoff without washing his hands of the pig's blood, transferring the bat-pig hybrid to her and creating the MEV-1 human strain.

Meningoencephalitis Virus One

Meningoencephalitis Virus One (MEV-1) is the fictional highly contagious and lethal meningoencephalitic virus that appears in the film. Its origin and symptoms are based on the [Nipah virus](#).

The virus itself is a [paramyxovirus](#) that infects both the lungs and the brain, causing hacking coughs and fever and a severe headache, followed by a seizure, brain hemorrhage and ultimately death. With a fast incubation period MEV-1 kills a person within 3–4 days of contracting the virus with symptoms emerging

only hours after infection. The virus itself is transmitted via respiratory droplets and [fomites](#), surfaces that infected individuals have come into contact with.

In the film, the virus is portrayed as being one of the most dangerous infectious agents, combining a fast and hard-to-control form of transmission and a mortality rate in excess of 20%. The film itself does not tell the audience an exact number for the amount of deaths attributed to the virus, but towards the end of the film, a newscaster announces the death toll to be near 26 million globally.

Themes

Soderbergh was motivated to make an "ultra-realistic" film about the public health and scientific response to a pandemic. The movie touches on a variety of themes, including the factors which drive mass panic and loss of social order, the scientific process for characterizing and containing a novel pathogen, balancing personal motives against professional responsibilities and rules in the face of an [existential threat](#), the limitations and consequences of [public health](#) responses, and the pervasiveness of interpersonal connections which can serve as [vectors](#) to [spread disease](#). Soderbergh acknowledged the salience of these [post-apocalyptic](#) themes is heightened by reactions to the [September 11 attacks](#) and [Hurricane Katrina](#). The movie was intended to realistically convey the "intense" and "unnerving" social and scientific reactions to a pandemic.

The film presents examples of [crowd psychology](#) and [collective behavior](#) which can lead to [mass hysteria](#) and the loss of [social order](#). The bafflement, outrage, and helplessness associated with the lack of information, combined with new media such as blogs, allows conspiracy theorists like Krumwiede to spread disinformation and fear, which become dangerous contagions themselves. Dr. Cheever must balance the need for full disclosure but avoid a panic and allow the time to characterize and respond to an unknown virus. The movie indirectly critiques the greed, selfishness, and hypocrisy of isolated acts in contemporary culture and the unintended consequences they can have in the context of a pandemic. For example, the [Centers for Disease Control and Prevention](#) recommends "social distancing" by forcibly isolating the healthy to limit the spread of the disease, which stands in stark opposition to contemporary demands for "social networking". Responding to the pandemic presents a paradox, as the contagiousness and lethality of the virus instills deep distrust of others but surviving and limiting the spread of the disease also requires individuals to work together.

Against this existential threat and fraying social order, the film also explores how individual characters bend or break existing rules for both selfish and selfless reasons. Dr. Hextall violates protocols by testing a potential vaccine on herself, Dr. Sussman continues experiments on a cell line despite orders to destroy his samples, Dr. Cheever notifies his wife to leave the city before a public quarantine is imposed, Sun Feng kidnaps Dr. Orantes to secure vaccine supplies for his village, Dr. Mears continues her containment work despite contracting the virus, and Krumwiede is paid to use his blog to peddle [snake oil](#) cures so as to drive demand and profit for investors in [Alternative Medicine](#).

Soderbergh repeatedly uses the cinemographic style of lingering and focusing on the items and objects which are touched by the infected and become vectors ([fomites](#)) to infect other people. These objects link characters together and reinforce the multi-narrative "[hyperlink cinema](#)" style which Soderbergh developed in [Traffic](#) (2000) and [Syriana](#) (2005), which he produced.

The movie also highlights examples of political cronyism (a plane to evacuate Dr. Mears from Minneapolis is instead diverted to evacuate a Congressman), platitudes and rigid thinking (public health officials consider delaying the closing of shopping malls until after the [Thanksgiving shopping season](#)), federal responders trying to navigate fifty separate state-level public health policies, and the heroism of Federal bureaucrats. Soderbergh does not use type-cast pharmaceutical executives or politicians as villains, but instead portrays bloggers such as Krumwiede in a negative light. Social media plays a role in Krumwiede's accusations against Dr. Cheever and in Emhoff's daughter's attempts to carry on a relationship with a boyfriend through text messaging. Other responses in the movie, such as Emhoff's appropriating a shotgun from a friend's abandoned house to protect his home from looters, imposition of federal quarantines and curfews, the allocation of vaccines by lottery, inadequate federal preparation and responses, and use of bar-coded wristbands to identify the inoculated highlight the complex tensions

between freedom and order in responding to a pandemic. Soderbergh uses Emhoff to illustrate the micro-effects of macro-level decisions.

Scientific Accuracy

Soderbergh and Burns have been praised by Ferris Jabr in the [New Scientist](#) for practicing "in effect very successful science communication." Jabr cites story elements such as "the fact that before researchers can study a virus, they need to figure out how to grow it in cell cultures in the lab, without the virus destroying all the cells" as examples of accurate depictions of science. Soderbergh and Burns also re-shot scenes when scientific advisers objected to their scientific accuracy.

[Carl Zimmer](#), a science writer, praised the film, stating, "It shows how reconstructing the course of an outbreak can provide crucial clues, such as how many people an infected person can give a virus to, how many of them get sick, and how many of them die." He also describes a conversation with the film's scientific consultant, [W. Ian Lipkin](#), in which Lipkin defended the rapid generation of a vaccine in the film. Zimmer writes that "Lipkin and his colleagues are now capable of figuring out how to trigger immune reactions to exotic viruses from animals in a matter of weeks, not months. And once they've created a vaccine, they don't have to use Eisenhower-era technology to manufacture it in bulk."

[Paul Offit](#), a pediatrician and vaccination expert, praised the depiction of science in the film, writing "typically when movies take on science, they tend to sacrifice the science in favor of drama. That wasn't true here." He cites the film's usage of concepts like [R0](#) and [fomites](#), as well as the fictional strain's origins (based on the [Nipah virus](#)), as examples of science well illustrated in the film ([Wikipedia, 2012](#)).