

## Basic Information on Infectious Diseases for Role Playing Games

Call of Cthulhu

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### Introduction

Although this information is presented for Call of Cthulhu keepers, this information is just basic biology and could be useful for many role playing games. In Call of Cthulhu, there are many opportunities for the introduction of real or imaginary medical ailments. The characters are going to be exposed to beings and objects of an alien nature. They will explore strange ancient or isolated areas. They will encounter evil individuals who would not think twice about exposing individuals or large masses of people to illness in order to appease their evil gods or to cause misery and induce hysteria. In addition to the fact that disease may be the logical result of the players' actions, medical illness is scary. The vectors (transmitters) of many diseases are not understood or cannot be seen. Ways to protect oneself may be unclear and even the well-educated may become superstitious. Although most people are afraid of dying, many more are afraid of suffering. An inexplicable or incurable progressive illness is probably the scariest real world event of which most people can think, possibly second only to the death or harm of a loved one. This document will give some general information about some medical conditions. I will not attempt to tie each disease entity into the Cthulhu mythos and will leave this to creative keepers. Medical jargon is included to help provide realistic descriptions. .

### General

I will try to avoid details of implementation leaving this individual keepers to decide. However, I will make some general suggestions in this section. The attributes most likely to be affected by illness are CON and HP. A loss of HP would represent a temporary illness which would resolve with time, rest, and/or treatment. A more serious short term illness from which the character would never recover completely or a chronic debilitating illness would be expected to result in the loss of CON. All of the other attributes do not have such easily separated short and long term components and it would be up to the keeper whether losses should be permanent or temporary. If temporary, the keeper would need to decide on the requirement (time, rest, medical treatment etc) and rate of recovery. With chronic illness, it is possible that the character's STR and/or POW are reduced. Diseases that affect the brain may cause loss of INT. Diseases which affect other parts of the nervous system or affect the presence or function of the limbs may cause the loss of STR and/or DEX. Diseases with obvious visible manifestations may cause the loss APP. Any skills based on these attributes would be proportionally reduced. As you can see, any of the character's statistics may be influenced by the presence of illness with

the possible exception of EDU.

For the purposes of this document, only the infectious diseases will be considered. Cancer, cardiovascular disease, respiratory disease, renal disease, gastrointestinal disorders, rheumatologic disease, endocrine disorders, neurologic disease, and environmental exposures will not be explored.

The infectious diseases will likely be the illnesses most heavily drawn upon by keepers. Environmental exposures such as heat, cold, toxins, and ionizing radiation would likely be second. Any deity or creature associated with filth, decay, or death could be associated with the infectious diseases. In general, the balance of health versus illness depends on the virulence (aggressiveness) of the infectious agent and the resistance of the host. A highly virulent organism can cause illness in a normal host but a minimally virulent organism can only cause disease in a host with reduced resistance. Infections are frequently associated with inflammation. The suffix associated with inflammation is -itis as in osteomyelitis (inflammation of the bone) and myocarditis (inflammation of the heart). The four classical symptoms of inflammation are calor, dolor, rubor and tumor - heat, pain, redness, and swelling. The number and type of infectious diseases is astounding. Many infections have a specific geographic distribution and are generally more rapidly diagnosed by physicians familiar with them. The ambient temperature, species of animal vectors (carriers), and sanitary conditions also come into play.

Since there are too many to describe each in depth, I will simply try to separate them into categories on the basis of the infectious organism and give some examples. Information on diagnosis, treatment, and prognosis for each disease will not be included for the sake of brevity. This document will hopefully give keepers ideas and lead them to pursue more information on line or at the library. These will be listed according to the size of the organism in decreasing order.

### Parasites

The largest of the infectious organisms are the parasites. These include worms (helminths) such as nematodes (roundworms)- trichinella, ascaris or hookworm, enterobius or pinworm, and filaria the cause of elephantiasis. Other pathologic worms include trematodes (flatworms) with names like Schistosoma, Clonorchis, and Opistorchis more commonly known as flukes and cestodes (segmented worms) know as the taenia (beef tapeworm, pork tapeworm/cysticercosis) and echinococcus.

### Protozoa

The protozoa are microscopic parasites. Infection can be caused by ingestion such as amebiasis and toxoplasmosis. Ameba can cause dysentery and liver abscesses. Toxoplasmosis is the result of ingestion of organisms from cat litter boxes, contaminated soil, or undercooked meat. Although usually not a serious problem for immunocompetent individuals, it can cause cysts within the brains of immunocompromised individuals and the in utero children of acutely infected pregnant women. Other protozoan infections can be spread by insect bites such as malaria and trypanosomiasis (Chaga's Disease and African Sleeping Sickness). Malaria is the most important parasitic disease worldwide causing several million deaths per year. It is a red blood cell parasite causing a chronic febrile illness in tropical regions such as Africa, South America, and Southeast Asia. Chaga's disease is a chronic infection that can lead to heart failure and gastrointestinal problems typically years after infection in Central and South America. Sleeping Sickness results from invasion of the brain and leads to progressive indifference,

daytime sleepiness, movement disorders, and in the final phase coma and death.

### Fungi

Mycoses or fungal infections typically cause severe disease in immunocompromised individuals. They more frequently infect through inhalation or inoculation rather than ingestion. Histoplasmosis and Coccidiomycosis are endemic in parts of the United States. Others such as *Candida* and *Aspergillus* are ubiquitous (everywhere) in the environment.

### Mycobacteria

The mycobacteria are typically slow growing organism which the body can have difficulty eliminating. Species of mycobacteria are responsible for tuberculosis and leprosy (Hansen's disease). Although uniformly fatal in the past, effective therapy now exists for these diseases. Prolonged courses of therapy are required and frequent relapses occur.

### Bacteria

Bacterial infections are the most common cause of severe infections in human beings. Because of this, the development of effective antibacterials and aseptic (sterile) technique are considered the most important advances of the 20<sup>th</sup> Century. The common bacteria are generally divided into Gram-positive and Gram-negative on the basis of their staining properties under the microscope using Gram's stain. They are typically named on the basis of their shape as cocci, bacilli, and spirochetes - spheres, rods, and spirals. Examples of the Gram-positives include *Streptococcus* a cause of many types of infection, *Staphylococcus* a cause of skin infections, *Corynebacterium* the cause of diphtheria, *Listeria*, *Clostridium* the cause of tetanus and botulism. Examples of the Gram-negatives include *Meningococcus* a cause of meningitis, *Gonococcus* the cause of gonorrhea, *Haemophilus* and *Legionella* causes of pneumonia, *Bordetella* the cause of pertussis, the enteric bacilli including *Escherichia coli* and many others, *Salmonella* the cause of typhoid fever, *Shigella* the cause of bacillary dysentery, *Vibrio* the cause of cholera, and *Yersinia* the cause of bubonic plague. Although most infections cause disease through direct tissue invasion, some cause illness primarily through the production of a toxin such as tetanus, botulism, and cholera. The Spirochetes includes *Treponema* the cause of syphilis and *Borrelia* the cause of Lyme disease.

### Viruses and Prions

The viruses are some of the smallest of organisms. They are not able to replicate on their own. They supply their own instruction set to cells and usurp the host cell's own machinery for their reproduction. Viruses are frequently protected against by way of vaccination. Vaccination involves the exposure of a person to an attenuated (weakened) strain of the virus, killed virus, or recombinant (manufactured) viral proteins. This exposure primes the immune system so that when the body is exposed to this contagion at a later time point, defenses can be mobilized so quickly that infection is wiped out before it can take hold. Some viruses have also been associated with the development of cancer. The viruses are divided into the DNA viruses and the RNA viruses.

The DNA viruses enter the cell and take over the host cell so that it now becomes a factory for viral DNA. Examples of DNA viruses include the Herpes virus, Varicella-Zoster virus the cause of chicken pox and its reactivation called shingles, Epstein-Barr virus the cause of infectious mononucleosis, smallpox which has been all but eliminated, hepatitis B, and Papilloma virus the

cause of warts.

The RNA viruses require an additional step as compared to the DNA viruses. They must always encode the instructions for an enzyme that can make RNA from RNA, an RNA polymerase, or can backtrack and convert RNA to DNA, a reverse transcriptase. Normally, DNA encodes the genes and RNA is a copy of the DNA that can be used to make a protein, the structural elements and activators of the organism. The RNA viruses must either have a way to make RNA from RNA or make this process go backwards in order to reproduce themselves. Examples of RNA viruses include influenza the cause of the flu, HIV the cause of AIDS, polio, measles (rubeola), rubella (German Measles), mumps, hepatitis A, hepatitis C, rabies, yellow fever, dengue fever, and ebola virus.

Prions are a recently discovered class of infectious proteins. They are the only known pathogens devoid of nucleic acids, RNA or DNA. These abnormal proteins reproduce by binding to similar normal proteins and converting them into abnormal proteins. Sheets of these abnormal proteins create plaques which cannot be broken down. Prion disease is rare but has resulted in humans through genetic mutation, corneal transplant, contaminated brain hormone treatments, ritual cannibalism, and possibly ingestion of contaminated meat. Diseases caused by prions includes kuru, Creutzfeldt-Jakob disease, and bovine spongiform encephalopathy (mad cow disease).

#### Infectious Diseases in the 1920's

The following information was obtained from *The History of Medicine* 3<sup>rd</sup> Ed by F.H. Garrison from W.B. Saunders Company, 1922.

“Listerism; the gifts to mankind of Jenner, Pasteur, Semmelweis, Crede, and O’Dwyer; the chemical and bacteriological examination of the air, water, food, soils, and drugs; the purification of sewage; cremation; the hygiene of occupations and habitations; the medical inspection and care of school-children and factory children; the Binet-Simon tests; vacation colonies; social surveys and settlement work; the war on the white-slave traffic; the police surveillance of perverts and criminal characters in great cities like Berlin; the Gothenburg method of regulating the liquor traffic; the revival of the old Greek ideal of athletics and personal hygiene; the displacement of the medieval ascetic view of the sexual instinct by the clear-eyed scientific view; the formation of societies for moral prophylaxis and eugenics; the proposed legal regulation of marriage and sterilization of degenerate stock; the intensive study of alcoholism, the drug habit, syphilis, tuberculosis, and cancer; the use of medical bibliography and statistics to get extensive information as to pathological conditions in space and time; the cooperation of universities, armies, public health services and private endowments in tropical or parasitic diseases; international congresses; the Geneva Convention; even such things as Banting, Bertillonage, Esmarch bandages or sanitary towels and drinking cups, are all features of preventive medicine or medicine on a grand scale.”

Further information from this text reveals that in the late 1800's the connections between filariasis, Rocky Mountain spotted fever, African sleeping sickness, malaria, yellow fever and their respective insect vectors had been established. The causative agents of many diseases including amoebic dysentery, bacillary dysentery, pneumococcal pneumonia had been identified. In 1902, Sir Ronald Ross of the Indian Medical Service received the Nobel prize for his work in malaria. In 1905, Schaudinn and Hoffman discovered the causative agent of syphilis. In 1906, the causative agent of whooping cough was discovered.. The influenza pandemic of 1918-19 killed over 600,000.

Preventive medicine with sterile technique, improved sanitation, and insect control was making great strides. Vaccines and antitoxins were felt to be quite promising at this point in medical history with successes in rabies, diphtheria, and typhoid fever. Surgery was the major form of active therapy available and was also advancing in terms of safety and complexity. Pharmacologic treatment of the infectious diseases was limited. Quinine was available for malaria. Aspirin and other similar medications were also in common use. In 1910, salvarsan (aka compound 606, Dr. Ehrlich's magic bullet), an arsenic derivative, was introduced for the treatment of syphilis. Unfortunately, this medication was not without serious side effects. Although Fleming discovered penicillin in 1928, it did not become widely available until 1940.

### Conclusion

I hope this review has been instructive and not too boring.

### Appendix. A Random Serious Infectious Disease Table

I have tried to create a random table when you just want to leave the choice of disease to chance. Most infections cause pain and fever so to avoid redundancy these have been omitted as common symptoms. Most infections are acute (sudden). Infections which can be chronic (gradual) are marked as such. This is a small fraction of the possible infectious diseases and entries could certainly be added, deleted, or substituted as the keeper sees fit.

Roll	Disease	Organism	Vector	Common Symptoms
1	Anthrax	Gram+ Bacillus	Animals/Animal Products	Contact causes skin infection with black lesions Spore inhalation causes cough and shortness of breath
2	Botulism	Clostridia	Tainted Food	Paralysis due to toxin
3	Bubonic Plague	Yersinia	Flea	Black swollen glands (buboes), cough
4	Endocarditis (heart valve)	Streptococcus, Staphylococcus, others		Anemia, weight loss, chronic
5	Encephalitis (brain)	Varied viruses	Varied Insects	Headache, confusion, seizures, coma

6	Gastroenteritis (Dysentery)	Salmonella (Typhoid), Shigella (Bacillary), Ameba, E. Coli, Vibrio (cholera), varied viruses, others	Sewage	Diarrhea (bloody with some), cramping, vomiting, dehydration
7	Hepatic (liver) Abscess	Ameba, Enteric (colonic) Gram-Bacilli	Contaminated water, other gastrointestinal infections	Fatigue, weight loss, chronic
8	Hepatitis (Liver)	Hepatitis Virus	Raw shellfish, sewage, needles, blood products	Jaundice (yellow skin and eyes), swelling, weight loss, acute or chronic
9	Leprosy	Mycobacteria		Progressive skin and nerve deterioration, chronic
10	Malaria	Plasmodia	Mosquito	Anemia, weight loss, chronic
11	Meningitis (Spinal cord lining)	Streptococcus, Hemophilus, Meningococcus, others		stiff neck, headache, vomiting, seizures
12	Osteomyelitis (bone)	Streptococcus, Staphylococcus, others	Trauma or spread from a systemic infection	Pain, weight loss anemia, chronic
13	Pneumonia (lung)	Streptococcus, Mycoplasma, others		Cough, shortness of breath
14	Pyelonephritis (kidney)	Enteric Gram-Bacilli		Pus or blood in urine, vomiting
15	Rocky Mountain Spotted Fever	Rickettsia	Tick	Headache, severe rash

16	Sexually Transmitted Disease	Gonococcus, Treponeme (Syphilis), Herpes virus, others		Varies-including ulcers, discharge, rash, some are chronic
17	Skin Abscess	Streptococcus, Staphylococcus	Frequently trauma	
18	Tetanus (Lockjaw)	Clostridia	Trauma	Infection produces toxin which can lead to rigidity, seizures, and respiratory failure
19	Tuberculosis	Mycobacteria		Cough often bloody, fatigue weight loss, chronic
20	Typhus	Rickettsia, others	Lice, mites (chiggers)	Headache, rash