

Pathology Rework Feature Specification

Goonstation's pathology system is incredibly tedious, difficult, and often boring. The pathology area is often left untouched, even during populated shifts. The mechanics themselves are not easy for new people to get into due to the system being overly complicated and mostly RNG based. The goal of this rework is to breath new life into the system and give it value for every shift, turning it into an important department.

If you spot any sort of grammatical or spelling error, or come across a section this is difficult to read and could use clarification, please leave a comment on this doc. For all discussion, please see the Goonstation thread: <http://forum.ss13.co/showthread.php?tid=6685>

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1: Changes to Core Mechanics

Pathologist Role

Due to the rework completely overhauling pathology, making it both easier to grasp and potentially deadlier, a new "Pathologist" role will be added. This role will give access to the medbay and the pathology lab, similar to how the "Geneticist" role functions.

For syndicate items available to traitor pathologists, see section 3.

Symptom Recipes

With the current pathology system, the only real way to discover powerful symptoms is to brute force the correct sequence. This is an incredibly boring and time consuming process that can be very difficult to understand and ultimately relies more on RNG than skill.

Symptom recipes aims to turn pathology into something more akin to the current chemistry system. At round start 10 random “base” codes will be generated. Although the codes will be different from round to round, the “base” symptoms will stay the same. The base symptoms are as follows:

- Coughing
- Chills (goosebumps / cold)
- Sweating (mild fever)
- Yawning
- Farting
- Nausea
- Muscle aches
- Runny / stuffed up nose
- Sneezing

To create more advanced symptoms, you must combine base codes together. These symptom combinations will stay the same from round to round. Once you discover what combination of base symptoms creates something more complex, you can write it down and use it in future rounds. An example of how this works is as follows:

On shift 1, a pathologist gathers 3 base codes: A1Z, B2Y, and C3X. By viewing these codes under a microscope, the pathologist is able to get a very clear picture of which code matches to which base symptom. They can also inject these codes into a monkey if they would like 100% assurance. Using the microscope, they find the following symptoms:

- A1Z = Coughing
- B2Y = Sneezing
- C3X = Nausea

The pathologist then begins combining these codes together, in a very similar way to the current pathology system. After a bit of trial and error, they find that coughing and nausea combined creates a new tier 2 symptom (A1Z C3X). By injecting this new symptom into a monkey, they discover that it causes vomiting. The pathologist records this combination in an external program.

On shift 2, the pathologist uses a microscope to figure out which base codes match up to coughing and nausea. They find that coughing is H4T and nausea is G9L. Although the codes have changed, the symptoms have not. Combining the two codes into H4T G9L will create the vomiting symptom.

Species Codes

With the current pathology system, pathogens can make a cross-species leap with no restrictions. This prevents many issues with pathogen testing: by testing your plague on an animal as a monkey, you risk infecting the entire station. With the new recipes system, it is important that pathologists have fine grained control over what their pathogen infects.

Species codes are a new DNA segment added to every pathogen. Simply put, every unique species has a unique code. For a pathogen to infect a given species, it must contain that species' code. To prevent accidental station-wide infections, all pathogens will spawn containing only the monkey species code.

To obtain a code for a species other than monkeys, you must find a special object that is associated with that species. For example, if you want to make a pathogen that infects bees, you'll need to collect some honey and extract a DNA sample from it. If you can't find honey, that's okay! Every species has 3 unique items associated with it. These items are secret and will take some figuring out for uncommon species.

To reward players that track down all 3 unique items for a species, they will be able to solve a minigame (minigame has yet to be determined, ideas welcome) to unlock the full species code. In future rounds, they can manually add this code to the pathogen. This will allow them to infect the associated species without needing to collect DNA. To prevent players sharing rare species codes every player will have unique codes, calculated using a hash. For example:

User	Hash	Bee Code	Human Code
SirSavary	7f4915b92a7b6ed6425ee6e66dd5a56e	7F4	915
Wire	a929c1130405d83773b79d69c0e8b584	A92	29C

Although species codes could be bruteforced, there's 46,656 possible codes; even more if the code length is changed.

Transmission Vectors

Information on how you become infected with a pathogen is very limited. The rework aims to iron out how you become infected, making things both more realistic and consistent, and giving more options to would-be bioterrorists.

The possible transmission vectors are as follows:

- Bloodstream: syringe, emagged hypospray, etc
- Ingestion: consumption of pathogen, i.e. contaminated food or drink
- Direct contact (non-infected to infected): grabbing / pulling for a given amount of time
- Indirect contact: infected touches an object, non-infected touches object
- Droplet contact
 - Droplets are put into the air by coughing, sneezing, farting, and talking
 - If someone walks through the tile with droplets they have a chance to become infected (prevented by internals)
 - Droplets will eventually settle out of the air
- Airborne
 - Similar to droplets but stay in the air much longer
 - Air could become tainted when an infected moves through the tile

Each pathogen type will now only have certain ways it can spread:

- Bacteria: all vectors available with equal effectiveness
- Fungus: only effective via direct contact, airborne, ingestion, and blood stream
- Parasite: only effective via direct contact, ingestion, and blood stream
- Virus: only effective via droplet, direct contact, indirect contact, and blood stream

Cyborg Infections

Cyborgs with non-synthetic brains can become infected with pathogens, becoming both carriers of the pathogen and experiencing only its neurological symptoms. Examples of neurological symptoms include paranoia and space madness.

Procuring Additional Supplies

It's very easy to accidentally ruin the pathology lab. If you're not careful you can accidentally destroy all of your pathogen samples with no easy way to obtain more. To make these mistakes less punishing, the Quartermaster can now order a "Pathology Crate" containing some randomized pathogen samples.

2: Immune Systems

Currently, the only way for a player to prevent themselves from becoming infected is to wear internals. Most people do not bother suiting up at the beginning of a round and by the time people realize a pathogen is spreading across the station it's usually too late.

To give players an additional method of countering a deadly pathogen, all potentially infectable creatures will be given an "immune system" stat. This stat determines how easily a creature can be infected by a pathogen. Pathologists can get around this stat by tweaking how infectious their pathogen is, or by indirect means (such as feeding everyone junk food). For non-player creatures, this stat will be hardcoded based on species and cannot change. Players will be able to strengthen and weaken their immune system through various methods:

- New medicines / chemicals
- Eating healthy food to strengthen, junk food to weaken
- Genetics
- Traits
- Breathing without internals to strengthen, with internals to weaken (slightly)

This new statistic will give a new purpose to many different departments, increasing their usefulness and importance.

3: Syndicate Pathologist

Using the current system, a patient syndicate pathologist with RNG in their favor has a chance to infect and decimate the entire station. While this is often satisfying and usually hilarious, it relies far too much on RNG and tedium, when most **effective** syndicate antics rely on skilled planning (or rampaging with a hellthrower). With the rework, a syndicate

pathologist who is familiar with the role can be extremely effective at murderboning the station, to balance things out, non-antags will have a few new tools at their disposal:

- Quarantine Buddies
 - Similar to guard buddies, can be activated by the medical staff
 - Will roam the station, searching for players infected with a pathogen
 - When an infected player is found they will be flashed, covered in a bedsheet, and their position alerted to the medical staff so they can be quarantined
- Sterilization Chemicals
 - Intended to remove pathogens from the air and surfaces touched by infected
 - Can be mixed with smoke powder, foam, or even loaded into a fire extinguisher
- Immunobooster Crates
 - Ordered from the QM for a modest price
 - Contain syringes and pills full of an immune system boosting chemical
 - Intended to be used to halt a rampaging infection
- Medbay direct link to CDC, allowing medbay staff to bypass the QM
- Station-wide alert of a pathogen infects more than X% of the population

4: Generating Income via Pathology

Besides slaughtering the station or curing a rampaging plague, pathology has relatively no other uses and is often left untouched during most rounds. To make pathology more useful and fun, there will be 3 distinct new activities for pathologists, all of which generate income for the station.

Helpful Pathogens

With the new system, not all pathogens will be harmful. Certain symptoms may produce interesting results and unexpected interactions. For example, what happens if you infect the botany department's bees with a bacterium that causes them to both cough and have a larger appetite? More honey, of course!

By experimenting with pathogens and their symptoms, the pathology department can develop targeted infections that boost the productivity of other departments.

Bioterrorist QM Trader

In the event an unhelpful pathogen (read: terminal cluwn GBS) is created, it does not have to be exposed of. It can be delivered to the QM for sale to a brand new bioterrorism group for a great profit. Income from pathogen sales will depend on the perceived deadliness of the pathogen and will scale with the number of units sold. While lucrative, many believe bioweapon sales are unethical, resulting in unintended consequences.

Curing Colonies

There will be a brand new computer in the pathology department, giving you access to a list of space colonies (randomly generated names) that are requesting a cure for a pathogen they are infected with. Blood samples can be requested, allowing a pathologist to discover a cure. By sending the cure to the colony, it will be rid of the pathogen and the station will receive a hefty payment for the assistance.

5: New Random Events

To add some variety and fun to each round, new random events tying into pathology will be added, ensuring the department's importance.

Contaminated Late Joiner

Every time a player joins late, there is a small chance that they will bring an unknown pathogen aboard. This chance scales with the shift time and the pathogen is incapable of infecting the late joiner for a considerable amount of time, preventing them from panicking when they hop on the server.

Fungal Mutation

Space fungus round the ship has a very small chance to become a harmful fungus pathogen, spreading its spores into the surrounding area. Due to the subtle nature of this event, the space fungus will also radically change colors, hopefully standing out more to someone running past it.

NT Plague Emergency

A very important NT facility has become infected with an extremely deadly pathogen and command is requesting assistance with cure development. Blood samples and patient observations will be delivered to the pathology lab. Pathologists will have a time limit to develop a cure and send it back to NT.

If the cure is discovered, the station will receive a large sum of money or a rare item to play with. If the CDC is used to discover a cure, NT will be upset that funds were given to a 3rd party when a state of the art lab exists on the station. If a cure is not discovered at all, NT will be extremely displeased, punishing the station ~~by flying the escape shuttle into the sun~~ with a yet to be determined penalty.