Puro was founded by a group of industry veterans in the commercial lighting and controls market. Our vision is to create an organization with a focus on protecting people’s health and promoting wellness with specialized lighting technologies.
Corona viruses are named for the crown-like spikes on their surface.

Sometimes can infect animals and evolve to infect humans.

COVID-19 is a new coronavirus which causes respiratory illness.

- Other Corona viruses you might have heard about:
  - Middle East Respiratory Syndrome (MERS-CoV)
  - Severe Acute Respiratory Syndrome (SARS-CoV)

COVID-19 first reported in Wuhan, China (Dec. 2019).

This is an evolving infection and situation.
How Is COVID-19 Spread?

Spreads person to person by:

• People who are in close contact with one another (within 6 feet)
• Airborne - respiratory droplets – suspends in air for up to 3hrs
• Contact with contaminated objects and surfaces
• Hand shaking or someone sneezing directly into your face

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<th>New Cases</th>
<th>Total Deaths</th>
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How long will social distancing for coronavirus have to last? Depends on these factors.

We could see such second or third waves of outbreaks in countries still recovering from the first. Some experts think the virus will eventually infect 40 to 70 percent of the world’s population.

So it’s possible, even most likely, that after U.S. cases peak, Americans will still have to maintain some measures — such as isolating the infected, constant hand-washing, some degree of social distancing — until a viable vaccine is developed, which could take 12 to 18 months.

Source: https://www.washingtonpost.com/health/2020/03/16/social-distancing-coronavirus/
There are simple steps everyone can take to help prevent the spread of respiratory viruses like COVID-19:

1. Wash your hands often with soap and water for at least 20 seconds. If soap and water are not available, use an alcohol-based hand sanitizer.

2. Avoid touching your eyes, nose, and mouth with unwashed hands.

3. Avoid close contact with people who are sick.

4. Stay home when you are sick.

5. Cover your cough or sneeze with a tissue, then throw the tissue in the trash – or cough into your elbow.

6. Clean and disinfect frequently touched objects and surfaces.
Current Disinfection Practices

HAND HYGIENE

MANUAL CLEANING

UV Disinfection Pushcarts

ENHANCED CLEANING

Puro UV Fixtures and Mobile Units
History & Efficacy of UV

Germ killing properties discovered 140 years ago.

UV-C alters DNA structure of pathogens.

Pathogens can't develop resistance to UV light.

10+ years of peer reviewed research proving efficacy reducing HAIs.
Current and Emerging Disinfection Technologies: 405nm

- “Continuous Disinfection”, safe when occupied
- Only effective on some bacteria
  - Not viruses, fungus or mold
- 24hrs w/out occupancy kills 90% of some bacteria.
- Only slightly better than control
- Data doesn’t verify distance, only time
- Ask for data

Source: https://academic.oup.com/ofid/article/3/suppl_1/267/2635988
Three Types of Artificial UV Sources

- Low pressure mercury-vapor
- Fluorescent
- Pulsed-xenon
Established Technologies

Pulsed Xenon
Invented: 1960s

UV Transmissive Polymer
Invented: 1920s
Helo Fixtures
Protection From Above

HELO F2
- Lab Verified to kill 99.9% pathogens @ 3m/9.8ft in 30 minutes
- Pulse Xenon lamp rated for 2 million+ pulses
- BACnet compatible
- Dual light engine unit covers 12x12 area on a 10ft ceiling
- 120V Compatible
- 7 Amps at peak output
- 120W over 1 hour

HELO F1
- Lab Verified to kill 99.9% pathogens @ 2m/6.6ft in 30 minutes
- Pulse Xenon lamp rated for 2 million+ pulses
- BACnet compatible
- Covers 10x10 area on 10ft ceiling
- 120V Compatible
- 4 Amps at peak output
- 40W over 1 hour
Helo Fixtures: Safety

- Full diagnostic run before each disinfection cycle
- Motion sensor on each fixture
- Each 1-hour cycle equal to 2-3 seconds of UV exposure to humans and materials
- Brushed Aluminum housing for easy cleaning
Sentry Mobile Series
Protection that follows you

**Sentry M4**
The M4 has 4 full spectrum UV light engines on a mobile stand to bring germ-killing power to nearly any space.

**Sentry M2-C**
The M2-C is designed to bring the same Pulsed Xenon technology to spaces with a compact, yet stable design.

**Sentry M2-T**
The M2-T shines when you need a truly mobile option that can be easily transported up the stairs or on uneven terrain.
EPA and the Centers for Disease Control and Prevention (CDC) recognize that certain microorganisms can be ranked with respect to their tolerance to chemical disinfectants. The Spaulding Classification model, used by CDC, tiers microorganisms in accordance with the level of resistance to being killed (inactivation) by typical disinfectant products. With this approach viruses are divided into three viral subgroups (small non-enveloped, large non-enveloped, and enveloped) based on their relative resistance to inactivation (see below). According to this hierarchy, if an antimicrobial product can kill a small, non-enveloped virus it should be able to kill any large, non-enveloped virus or any enveloped virus. Similarly, a product that can kill a large, non-enveloped virus should be able to kill any enveloped virus.

**Small, Non-Enveloped Viruses (<50 nm):** These small, non-enveloped viruses can be highly resistant to inactivation by disinfection. Despite the lack of a lipid envelope, these organisms have a very resistant protein capsid. The following are viral families in the small non-enveloped subgroup: (1) Picornaviridae, (2) Parvoviridae, (3) Caliciviridae, (4) Astroviridae, and (5) Polyomaviridae.

**Large, Non-Enveloped Viruses:** Compared to small, non-enveloped viruses, these viruses are less resistant to inactivation by disinfection. Although they have a resistant protein capsid, their larger size (50-100nm) makes them more vulnerable than their smaller viral counterparts. The following are viral families in the large non-enveloped subgroup: (1) Adenoviridae, (2) Reoviridae, and (3) Papillomaviridae.

**Enveloped Viruses:** Enveloped viruses are the least resistant to inactivation by disinfection. The structure of these viruses includes a lipid envelope, which is easily compromised by most disinfectants. Once the lipid envelope is damaged, the integrity of the virus is compromised, thereby neutralizing its infectivity. The following are viral families in the enveloped subgroup: (1) Arenaviridae, (2) Bornaviridae, (3) Bunyaviridae, (4) Coronaviridae, (5) Filoviridae, (6) Flaviviridae, (7) Hepadnaviridae, (8) Herpesviridae, (9) Orthomyxoviridae, (10) Paramyxoviridae, (11) Poxviridae, (12) Retroviridae, (13) Rhabdoviridae, and (14) Togaviridae.

Under the criteria outlined in Section III of this Guidance, this hierarchy is used to determine a product’s anticipated efficacy against an emerging viral pathogen.
Class 1 – Small, Non-Enveloped Viruses (<50nm) – these are considered “highly resistant” to disinfection and are the HARDEST TO KILL – this group includes Caliciviridae (Norovirus) – which we have demonstrated kills at the 99.9% level

Class 2 – Large, Non-Enveloped Viruses – these are considered “less resistant” to disinfection and are LESS HARD TO KILL – this group includes lesser known viruses like Reoviridae and Adenoviridae

Class 3 – Enveloped Viruses – these are considered the “least resistant” to disinfection and are the EASIEST TO KILL, including Coronaviridae (Coronavirus), Ebola and Influenza

And, according to their Emerging Viral Pathogen Protocol, you need to have validation that you can inactivate at least one large or one small non-enveloped virus to be eligible for use against an enveloped emerging viral pathogen.

Since we have 99.9% inactivation against a Class 1 small, non-enveloped virus, according to the EPA, if we were a formally approved disinfectant for norovirus, we would be considered to be effective against any Class 3 enveloped virus and could make claims until this Protocol.
Applicable Facilities

- **Quasi Government-Municipal**: Transit Authorities, Airports – For Profit-Gov
- **Corporate Offices**: Facilities that need to be open everyday
- **Retail/Grocery**
- **Hospitality**: Hotels, Airlines Theme Parks, Museums
- **Sports**: Gyms, College/University and Pro Sports: Arenas, Stadiums, Locker Rooms and Club Houses
- **Education**: College/Universities, K-12, Pre-School and Daycares
- **Healthcare**: Hospitals, Primary Care, Cancer Centers
- **Emergency Services**
Design Process
Design Process
Design Process
THANK YOU

www.PuroUV.com