Quarantine of UV-Shine Itself Instead of Quarantine Infectious Agents as a Physical Control Method is the only Ever-Known Effective Way for Stopping the Spreading Potential of 2019-nCoV in China and Later Possibly Disseminate to the Global

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Abstract: The International Committee on Taxonomy of Viruses has proposed the name SARS-CoV-2 for the coronavirus that was provisionally called 2019-nCoV. Labs around the world are increasingly trying various solutions for curing or stopping the spread of this ferocious virus. The immunological vaccine solution is quite challenging since the envelopes of the viruses have already included human ingredients that detached from hosts. Most importantly, there is no time left for various chemical and biological studies to find an effective drug or vaccine. To stop the spreading at once is the top global urgent priority issue. Under the present condition, the physical method of applying ultraviolet lights and requires humans on-site with their own UV protection is the only one and ever known cost-effective method that can effectively stop the uncontrollable contagious spreading.

Keywords: SARS-CoV-2, 2019-nCoV, Ultraviolet (UV), quarantine the UV, conventional quarantine, UV radiation box (wall)

1. Introduction

Ultraviolet (UV) is electromagnetic radiation with a wavelength from 10 nm to 400 nm, shorter than that of visible light but longer than X-rays. UV radiation is present in sunlight and constitutes about 10% of the total electromagnetic radiation outputs from the Sun. UV radiation from artificial devices with wavelengths from 240–280 nm usually used for air, water, transparent materials, and shallow surface decontamination & sterilization (DNA absorption has a peak at 260 nm). Commercially available low-pressure mercury-vapor lamps emit about 86% of their radiation at 254 nm, with 265 nm as the peak germicidal effectiveness curve. This one and diverse alternative products and similar are quite lower prices with robust results compare to all other disinfection solutions. UV protective hoods that allow people to work under UV radiation are quite lower cost for personal use, and much more effective to stop infection than various routine ways such as masks, protective clothes, and chemical sanitizers, etc.

This physical control method strongly recommended that from family items such as beds, masks, clothes, equipment, and rooms, etc., till all available public passages and assembly ranges such as retail stores, gyms, supermarket, hospital, cinema, libraries, meeting rooms, lecture halls, churches, flea markets, bank counters, custom passages, airports, commutation stations, and all manufacturing regions, etc., should be equipped with enough number of remote-controlled UV lights with administrations based on local potential risk levels. Remote-controlled is for avoiding direct shining on naked human skin and regulating with enough personal protections in severe contagious regions or selecting UV radiation box or similar devices while humans on-site for less critical areas. All UV lights should compose of explosion resistant safety glasses to comply with glass policy if affordable.

Historically, quarantine the contagious agents is the basic way to deal with all the infectious problems; masks, protective clothes, chemical sanitation, etc., composed of the quarantine system. This system deals with moderate infection quite effective; however, for stronger infection spreading with aerosol in public regions like what happened in China now, this system is insufficient. Now the recommended method doesn’t quarantine the contagious agents, just make a partial or fully UV radiation active working environment; then, quarantine the UV hurt to naked skin and eyes instead of quarantine the infectious agents themselves. This method can effectively deal with the most severe biological infectious agent with low cost and impact on the human public life with minimum. We can see a concrete example to compare this UV quarantine method with the conventional quarantine equipped with masks, protective clothes, and chemical sanitizers. Suppose there is a 2×2 m² public area, with one health people and one infected people go in and out this region every minute in 8 hours period every day. If the health people use masks and protective clothes to prevent them from the infection, then some of the high impact masks or protective costumes need to resist 8x60 = 480 infected people’s aerosol and other touched surfaces, any neglecting with the number of chemical sanitation round will induce a risk. Masks are useless while people are too close, even they can be disposable. Protective clothes are generally not disposable; however, the daily cleaning and changing of these protective clothes need complex equipment & protocols that are generally challenging for those unprofessional people. Therefore, the use of protective clothing in the long term is also a risk. Applying chemical sanitizer for that region is also challenging; theoretically, each infected people go in and out
that region needs one sanitation, that region needs 480 rounds of sanitation, lower than this sanitation number means a risk. Also, chemical sanitation only deals with contaminated surfaces, quite insufficient for aerosol contaminants in the air. From this case, we can easily see, for public regions with people continuously in and out, conventional quarantine is higher cost and yet quite reluctant to stop the infection. In contrast, a UV light in this region for 8 hours is enough to prevent all the infection under the same condition; also, quite cost-effective, just need some UV protection for each people in and out of that region. Compare to quarantine clothes, UV protection is a lower cost, easy to use for unprofessional people, and quite effective to stop the infection.

Conclusion, quarantine UV radiation personal impacts instead of quarantine infectious agents themselves is a lower cost and 100% infectious stop method under severe infection emergency conditions. UV radiation with personal protection can effectively replace routine precautions such as masks, protective clothes, chemical sanitation, quarantine hospitals, etc., under this urgent condition.

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Author’s Contributions

Lai, Y.Y., perceived the models and wrote the brief.

隔 离 紫 外 线 本 身 代 替 隔 离 传 染 物 是 目 前 唯 一 已 知 最 有 效 的 阻 止 2019-nCoV 新 冠 状 病 毒 在 中 国 和 随 后 可 能 在 世 界 其 它 地 区 迅 速 传 播 的 有 效 物 理 控 制 方法

国际病毒分类委员会建议将当地称为2019-nCoV的病毒命名为SARS-CoV-2, 全世界的实验室都在为治疗和解决病毒传播问题尝试各种方法。免疫学疫苗的方法面临一些挑战, 因为这病毒的封套带有从寄主来的成分。更重要的是, 留给各种化学和生物学体系找到新药的时间所剩无几, 彻底斩断病毒传播是全球第一紧急优先考虑。在这种形势下, 使用紫外灯进行物理控制是目前已知有效有用低成本阻断传播的唯一技术方法。

紫外线是10-400nm的电磁波, 比可见光波长短但是比X射线长。阳光中也有10%左右紫外线。人工装置中产生的240-280nm波长的辐射通常用于空气，水和物品表层进行脱污染或灭菌(DNA在260nm有吸收峰)。商业低压汞灯可以产生高达86%的254nm波长。这一产品和一些类似产品，对比其它解决方法，都能低价位产生稳定效果。

当处于紫外灯下作业时候，紫外防护罩是比各种传统方法如面罩，防护服和化学消毒灯等更为廉价且更为有效阻挡个人之间传染。

该物理方法强烈推荐，从家庭用品，例如床铺，面罩，防护服等；直到各种公共通道和公共区域，例如，零售店，健身房，超市，医院，电影院，图书馆，会议室，讲座厅，教堂，跳蚤市场，银行柜台，海关通道，机场，公交站和各种企业生产区域等，应该装备足够数量的遥控紫外灯，遥控是避免直接辐照到人体裸露皮肤。在严重疫情地区，要求人们佩戴个人保护装置才能进入公共区域，而在疫情不严重地区，可在人们离开公共区域后进行管理性紫外辐照。当然，在能承受情况下所有紫外灯都应该使用防爆玻璃，以符合玻璃易碎物管理政策。
From a historical point of view, isolation of infectious agents is the most basic method of dealing with infectious diseases. Face masks, protective suits, chemical disinfection, etc., all constitute the basic parts of this isolation system. This system is effective to some extent for moderate infectious diseases, but it is unable to cope with severe infectious diseases such as COVID-19 which is currently spreading in China. Therefore, the proposed method is not to isolate infectious agents, but to create a partial or full UV-irradiated environment and isolate UV damage instead of infectious agents. This special isolation method can effectively suppress the most severe biological infections and has the least impact on people's lives. We can use a specific example to compare UV isolation and traditional isolation methods such as masks, protective suits, and chemical disinfection. Suppose there is a 2 × 2 m² public area, and every 8 hours there is one infected person and one healthy person entering and leaving. If healthy people use masks and protective suits, some masks and protective suits need to withstand 8 × 60 = 480 infectious agents for 8 hours, and any疏忽 are risks. Moreover, even if it is a one-time mask, it is almost useless when used in close proximity. Currently, protective suits are not disposable, and their cleaning is very complex, which is a big challenge for people without professional training. Long-term use of protective suits is also a risk. Using chemical disinfection is also a challenge. In theory, the public area should be disinfected chemically every time an infected person enters, which means that the area needs to be disinfected chemically 480 times a day, and any fewer times are risks. Moreover, chemical disinfection usually only affects surface objects, making it difficult to deal with airborne infectious agents. From this case, we can see that traditional isolation in public areas with continuous human traffic is expensive and difficult to implement. However, if this area has an UV lamp to maintain 8-hour UV irradiation, it can effectively block all the infections, and people entering the area need some personal UV protection. Compared to virus isolation protective suits, personal UV protection is not only cheaper and easier to use by non-professionals, but can also effectively block infections.

The conclusion is that in a public area, irradiation of UV protection can replace the isolation of infectious agents itself. This method can effectively, cheaply, and efficiently replace traditional methods such as masks, protective suits, and chemical disinfection.
a) a UV lamp with remote control on my office table, its remote control has 15 seconds of lag time with beeps, which helps people to avoid directly radiating on naked skin.  

b) before entering into the office room, I light up the UV lamp for 30 min.  
c) after 30min of mandatory UV disinfection for the table, then I can work. You can see a cardboard box nearby the computer. We call such kind of box as “UV radiation box”, it can be conveniently made from various available ways.  
d) the post on the UV radiation box.  
e) the UV lamps continuously shining inside the UV radiation box while I'm working, due to the cardboard box, working on the computer is safe, no UV radiation directly on naked skins, and the ozone produced by the UV lamp permeating the room to kill the coronavirus.  
f) this is a small “UV radiation wall” box, while I need to talk with some people, we sit on the chairs in the photo and put such a cardboard box between us, no masks required.  

g) now, you can see the UV lamps shining inside the cardboard box, it produces an invisible UV radiation wall to kill the virus. This UV radiation wall does not directly shine on naked human skins and with a virus clean efficiency even better than that of a UV radiation box in (Fig.1b). Under such a situation, the aerosol coronaviruses between are 100% be stopped to infection; it is a device offering safe talk between healthy people and a heavily infected person.  
h) our conference room, before entering there, we light up the UV lamps for 30 min. After 30min of mandatory UV shining to clean the virus in the air, we then can go to the room to start a meeting.  
i) if there are some people doubt of infection, we use such a UV radiation box. You can see the post on the box “Please switch on the UV lamp with remote control for 30 min aerosol disinfection before the meeting.”
meeting, avoid the radiation direct to naked skin. In the meeting, please put the UV lamp inside the box, and then switch on to keep it shining“. j) the UV lamp is continuously shining inside the UV radiation box while we are meeting; we are safe due to the box can quarantine UV hurt, and also the ozone produced by the UV lamp can kill the virus in the air. k) the post on the company conference room gate, same with that on the UV radiation box. l) company dining room is taking a 30 min mandatory UV shining before lunch, this process can offer a room 100% free of coronavirus aerosol for dining, same with that in the conference room, we put a UV radiation box with a UV lamp shining inside while eating. m) one of the company washrooms, we mandatorily require every washroom must take 30 min UV disinfection before use. In the photo shows a single space washroom, for a multi-space washroom, UV lamps put in each space for 30min before each use. And a multi-space washroom also needs a UV radiation box in each space if we want to minimize the risk. Note: The public washroom is a critical infection transmission site, and the only feasible and quick sanitation method is still by means of a UV lamp before each use. Chemical sanitation is impossible to do before every use, and also quite weak for aerosol disinfection. n) the company registration, we still put a remote-control UV lamp on the registration desk. Before people come in and leave the door, we follow up with a 30 min UV disinfection. This is a critical step to prevent the virus from accumulating in the entrance door region.

For the company area, the principle is the same, for everything takes a 30 min UV disinfection before use. And put a UV radiation box (wall) if it is shared by more than one person. This rule comes from laboratories; biosafety cabinets, bio-clean rooms, pharmaceutical clean rooms, etc., are routinely taken 30 min UV disinfection for the air disinfection before each use. Now we just extend the biological laboratory method to the companies and families. For the UV radiation box (wall) method described in (Fig.1), that is to increase the ozone in the room for people not confirmed of coronavirus infection, and also need to use that public region. This way can minimize the required “Social distancing”. To date, there is indeed no empirical evidence for the officially regulated “Social distancing”. However, the method of increasing the ozone in the region to inhibit infection agents has stronger empirical evidence and a long history of board applications; all the biological laboratories in the world have relied on UV lamps for air disinfection.

Inside a family, we still use the same principle; issue 30 min UV disinfection for any rooms, equipment, utensil, etc. For more than one people share one room, one table, one piano, one gym region, one toy room, etc., then need to use a UV radiation box or similar device to replace masks, as shown in the company administration of (Fig.1). If any company or family member gets confirm of coronavirus infection, then all members have to use UV hoods, which we'll refer to in (Fig.3).

In (Fig.1) of company demonstration, we don't refer to the ventilation system, since most of the air inlets are on the roofs and inaccessible to people, for a family, or public apartments (condos) with central air-conditioning, need to consider the safety of air ventilation as a media for coronavirus transmission first. Now we can see an example of a family UV quarantine.

**Fig. 2 | UV quarantine method applied in a family**
a) the family entrance door (outside), use a UV lamp to clean the outside entrance door is easy, just after every member back to the home, arrange a 30 min UV shining; this is important to prevent the accumulation of coronavirus in the region. b) the family entrance corridor (inside), in here, outside shoes, clothes are taking a 30 min UV disinfection after everyone back home. For houses without such a corridor, it is still critical to use a UV lamp in the same way. c) UV lamps in the basement, near the ventilation air inlet, we can see there are eight UV lamps with different sizes present there. The calculation of the numbers of UV lamps in this region is based on the product instruction that an 8W UV disinfection lamp can cover 12m² static area. Due to the air from the air-condition ventilation need send to all rooms, the number of UV lamps here should enough to cover the total area of all rooms of the house and not just the basement. Such an air inlet UV control method is relatively simple; then there is no need to take care of every air outlet in each room. d) the basement UV lamps use such a certain to prevent the UV radiation directly shine on the people walk around, also prevent kids from accessing this region. e) this is a room ventilation outlet. If we lack control of the ventilation air inlet by UV lamps, then every ventilation outlet needs such a UV lamp, and also a cardboard box or similar device needs to shield the UV lamp from hurt people walk around. In an apartment or condo, control of the ventilation system is critical, since all the rooms share a central air conditioning, and the air inlets of which general not like those in a supermarket or manufactory site to be installed on the roof, infected people possibly access them. Therefore, in an apartment or condo, it is critical to use UV lamps at each ventilation outlets like this figure and also need to shield them. Ventilation control by UV quarantine should be 24/7, not something with only 30 min UV shining before each use if unknown of the air inlet control conditions. f) the family gym is taking a 30 min UV disinfection before each use. g) the family study table is taking a 30 min UV disinfection before each use. h) the family shower & washroom is taking a 30 min UV disinfection before each use. i) the family kitchen & dinar table is taking a 30 min UV disinfection before each use. j) the family piano is taking a 30 min UV disinfection before each use. k) the family kids’ room is taking a 30 min UV disinfection before each use. l) the bed is taking a 30 min UV disinfection before each use. m) the car is taking a 30 min UV disinfection before each use. Note, for a family car, even it is only used by one person, arrange routine 30 min UV disinfection is still necessary. A virus infection needs to trigger at a certain concentration threshold. If a person goes to work every day and always contacts with the virus at a lower than infection threshold, the virus concentration possibly accumulates inside his car to attain the threshold in a long period. UV disinfection in such a way can stop the virus accumulation process of the car.

From (Fig.2f-m), each region, each stuff, etc., still takes the same principle, a 30 min UV disinfection before each use, while only one person uses them. If two or more people share one room, one piano, one study table, one dinner table, one toy room, one gym device, etc., a UV radiation box is quite necessary. For kids’ room, if more than one child in there, we still need to put the UV radiation box on-site, and then need a baby sitter to prevent the children from dumping or damaging the box and leak the UV shine to hurt the naked skin. In a family, follow the abovementioned principle is vital, especially some people confirmed of infection and need to “quarantine at home”, the only way to quarantine at home is still using UV quarantine method and strictly follow the above principles. Even for a school, a public library, etc., if the virus is not severe, we still can use the same way, such as 30 min UV shining for the classroom, then on each children’s table put a UV radiation box. On a bus, an airplane, a restaurant, etc., 30min UV disinfection plus enough shielded UV radiation boxes to issue ozone, can greatly inhibit the coronavirus infection. Especially in a quarantine hospital, it is truly important to control the ventilation system, and also the rooms quite need the above UV quarantine method. However, for public regions with more people come in and out with a higher frequency, such as customs, airplanes, cinema, large slaughtering houses, etc., or for severely infected districts even without so dense visits, the above method becomes insufficient. We then have to light up enough UV lamps in these public regions and require everyone to go into the region with personal UV protection, such as a UV hood, and a pair of gloves, etc. We call this way as a UV hood method or the ultimate UV quarantine method. Now we can see what a UV hood is. They are just some simple human portable UV protection to be used in UV lamp active public regions.

**Fig. 3 | Ultimate UV quarantine method with UV hood in UV lamp active public regions**

a) Some types of commercial products which could be directly used as a UV hood for the UV quarantine method
b) Some types of commercial products claimed of UV protection functions; however, they only can shut off the natural UV radiation in the sunlight, can’t be used for our UV quarantine method under stronger artificial disinfection UV lamps.

e) This type of goggles can be used for UV quarantine

d) even a common umbrella can be used for UV quarantine

e) These types of products are not safe, need further UV quarantine

It is anything with one layer of cloth or similar to protect the naked skin, not necessarily the same with those in the (Fig. 3a). People can self-make one or just purchase an equivalent from the market. Note, they are not used to “filter” the coronavirus passively. UV-shine in the air already has 100% stopped all the aerosol transmission between people; the UV hoods only protect the UV hurt on naked skins of people. They can be dealing with as an ordinary cloth, throw into a washing machine if dirty, no need for any specialized sanitation, UV radiation is a good physical “sanitizer” for them. It is even no need for nucleotide or even temperature measurement while applying UV quarantine since UV light can 100% cut off the infection; just need people to use simple personal UV protection. For a community, yet with 80% of the population get infected, the UV quarantine method with UV hoods still can protect the remaining 20% of people free from the infection. UV hood is the ultimate choice for stopping the COVID-19 or other biological infectious agents.

For some commercial products like those in (Fig. 3b), they are designed for shut off UV radiation in natural sunlight, can’t be used for our UV quarantine method with stronger artificial disinfection UV lamp source. The product in (Fig. 3c) can be used for the UV quarantine method, a little bit expensive. The goggles for welders or the helmet for astronauts still work well. However, generally, it is no need for such kinds of goggles; just simple things like those in (Fig. 3a) can effectively prevent UV hurt in public regions if people are careful. Under some condition, even a dark-colored common umbrella as that in (Fig. 3d) works quite well as a temporary UV hood. Suppose a supermarket or a Border Custom passage lights up enough numbers of UV lamps on the ceilings and require all the people to use personal UV hoods before entering. Some people forget to bring their personal UV protection, then just offer them dark-colored common umbrellas for temporary use in that public region for avoiding UV hurt, which still works quite well. We also need to note, some fungi killing products that well available in the market like that in (Fig.3e) are not safe. If we want to use these types of products for fungi foot or fungi nails, we need to cover the naked skin and only allow the nails to get UV radiation. Simply use a pair of thick gloves, cut holes in the nail regions, then can use them. These types of products are much more effective than chemical medicine for fungi foot (nails); however, no such instructions on the product brochures; therefore, a reminder here albeit they are not directly concerned with COVID-19; just cutting holes on gloves is still a standard UV quarantine method.
Emergent Law should mandatorily require that all public regions equipped with enough UV lamps for people to use them under infection emergency conditions. It’s feasible, cost-effective, irreplaceable, and 100% stop the infection, including the infections induced by the asymptomatic COVID-19 patient.

In company范围内，原则其实是相同的。对每样东西都是使用前进行30分钟紫外辐照，如果某种东西被超过一个人共同使用，则要用紫外辐射盒进行30分钟紫外辐照。这和家庭内部一样，因为家庭内部比较小，所以使用紫外辐射盒进行30分钟紫外辐照就可以了。
COVID行必须颁布种的可怕场面出现吧?

最多的中国,大约只有突变而没有其它任何替代性选择紫外隔离会非常容易成为二次传染源染现在世界各地并没有更好的对付新冠的方法产品与对付真菌指甲或香港脚比化学药品并不安全并不够数量紫外灯够防止紫外伤害,只是有些价格昂贵对于某些类似c)图3-a).

紫外防护用具是对是防止紫外线对裸露皮肤的伤害产品与一些商业产品可以直接用来进行紫外隔离,对于某些类似d)图3-d).

这种护目镜可以用于紫外隔离某些情况下甚至电焊工和宇航员的护目镜也可以等同使用.

对于某些类似(e)图3-e).

紫外隔离终极方法还不够我们需要在这些地方点亮紫外灯或者虽然人是在医院这种方法对于家庭也适用.

从(f)图2-m),每个区域物品,都是相同使用前30分钟紫外辐照,共用时候使用紫外辐射盒,对于孩子玩具房,如果两个或多个孩子共同使用,仍然需要使用紫外辐射盒,但是需要人员照看,防止孩子不小心弄坏或弄坏紫外辐射盒而让紫外线直接照到裸露皮肤上.对于家庭,按照上述原则是非常重要的,特别是有家庭成员重症感染需要在家庭隔离,对于学校,图书馆等等,如果属于非重症区,也可以用这种方法,上课前30分钟辐照教室,然后每个孩子上放上放置紫外辐射盒.公交车,飞机上,30分钟辐照加上紫外辐射盒是必要的,特别是在医院,非人员控制通风系统,然后医生和护士办公室也需要上述紫外控制方法.对于某些公共场合,人员出入频率非常高,或者虽然人员出入频率不是非常高,但是属于重症区,例如:百货,机场,电影院,人员多的是区域,上述紫外隔离方法还不够,我们需要在这种地方点亮紫外灯,开灯作业,然后要求每个进入该区域的人员使用紫外防护用具,我们把这种方法叫紫外隔离终极方法.现在我们可以看看是什么紫外防护用具.

一般单层布防止紫外线照到裸露皮肤上就能成为紫外防护用具,不一定要是(f)图3-a)中形态,人们可以自制或则从市场上买到类似产品,注意,这些东西不是用于被动“冠状病毒”空气中紫外线已经100%阻断了气溶胶中病原在人群中传播,这些紫外防护用具只是防止紫外光对裸露皮肤的伤害.这些用具和其他通风系统,然后医生和护士办公室也需要上述紫外控制方法,但是,对于某些公共场合,人员出入频率非常高,或者虽然人员出入频率不是非常高,但是属于重症区,例如:百货,机场,电影院,人员多的是区域,上述紫外隔离方法还不够,我们需要在这种地方点亮紫外灯,开灯作业,然后要求每个进入该区域的人员使用紫外防护用具,我们把这种方法叫紫外隔离终极方法.现在我们可以看看是什么紫外防护用具.

对于某些类似(f)图3-b)的商业产品,是防止自然光用紫外光,无法用于紫外隔离,对于某些类似(f)图3-c)的商业产品可以用于紫外隔离,只是有些价格昂贵,电焊工和宇航员的护目镜也可以同样使用,不过一般情况下没有必要,使用类似(f)图3-a)的产品只要小心就足够防止紫外伤害,某些情况下甚至一把深色的普通雨伞(f)图3-d)也可以用于紫外隔离.例如一个超级市场或则海关通道在天花板上点上一些紫外灯,然后要求每个进入该区域的人员使用紫外防护用具,我们可以把这种方法叫紫外隔离终极方法.

紫外隔离终极方法.现在我们可以看看是什么紫外防护用具.

对于某些类似(f)图3-b)的商业产品,是防止自然光用紫外光,无法用于紫外隔离,对于某些类似(f)图3-c)的商业产品可以用于紫外隔离,只是有些价格昂贵,电焊工和宇航员的护目镜也可以同样使用,不过一般情况下没有必要,使用类似(f)图3-a)的产品只要小心就足够防止紫外伤害,某些情况下甚至一把深色的普通雨伞(f)图3-d)也可以用于紫外隔离.例如一个超级市场或则海关通道在天花板上点上一些紫外灯,然后要求每个进入该区域的人员使用紫外防护用具,我们可以把这种方法叫紫外隔离终极方法.

紫外隔离终极方法.现在我们可以看看是什么紫外防护用具.

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