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Understanding How Hubris Allowed COVID-19 Mitigation to Fail and Devastate the Economy Due to the Inability of the Experts to Grasp and Believe the Fundamentals of Innovative Technology.

ABSTRACT

The feeble accession at annihilation results of the COVID-19 pandemic has tested theory more than practicality. There has not been any convergence of cognitive thought from a wider range of people other than Doctors, Virologists, Academics, Politicians and so called "think tanks." This antiquated methodology serves political rather than practical aims. It relies heavily on the somewhat archaic postulation that past protocols have eventually solved similar problems and we can wait them out. This article describes the deployment of innovative materials and methods, tested in a CDC approved laboratory for efficacy against COVID-19 and compares it to currently available and popular methodologies.

AUTHOR AFFILIATIONS

Arthur V. Martin Ph.D. is President of Global Infection Control Consultants, LLC headquartered in North Miami, FL. He has 40+ years global expertise managing and mitigating pathogenic bioaerosol contamination in buildings along with design and construction of critical controlled environments including Hospital Operating Suites, Pharmaceutical Clean Rooms and Biosafety Laboratories. A former ASHRAE member, his past projects have been recognized with 1st place Awards for Existing Health Care as well as Existing Institutional Buildings. One of his projects was voted the Most Efficient Building in The Nation. He is the Environmental Consultant to The Faisal Group of Companies in Riyadh, Kingdom of Saudi Arabia, a member of the W.H.O. Stop TB board, and a Member/Researcher of the Infectious Diseases International Research Initiative, Ankara, Turkey as well as a Collaborative Researcher with Camarines Norte State University, Daet, Philippines. The author is also the Chief Scientist of a Tianjin, China Biotechnology company. He is a past nominee for the W.H.O Kochon Prize for innovative work with T.B. and in 2021 was nominated for a Nobel Prize specifically for innovative work with COV/D-19. That nomination was submitted by a former USA Assistant Surgeon General.

ARTICLE

The Centers for Disease Control and Prevention now states explicitly that airborne virus can be inhaled even when one is more than six feet away from an infected individual. The new language, posted on the C.D.C.'s website, is a change from the agency's previous position that most infections were acquired through "close contact, not airborne transmission." As the pandemic unfolded last year, infectious disease experts warned for months that both the C.D.C. and the World Health Organization were overlooking research that strongly suggested the coronavirus traveled aloft in small, airborne particles.

Despite insistence that surface contamination was a prime source of COVID-19 along with proximity to infected individuals almost no thought was given to transmission by aerosolization. We were repeatedly informed that there was no documentation to support this and only vaccination was the answer. Several scientists on Friday, May 7, 2021, welcomed the agency's scrapping of the term "close contact," which they criticized as vague and said did not necessarily capture the nuances of aerosol transmission.

Even with that announcement the government auspices have not undertaken a laser like effort to utilize that information for the better good of the populace. The author details the problem, the simplicity of solutions applied, the differences between them and how innovative thinking is often dismissed.

A study supported by the Medical Health Technology Project for Guangzhou, the Science and Technology Project of Guangzhou, and the Project for Key Medicine Discipline Construction of Guangzhou Municipality determined the following. Indications would substantiate claims that the virus initiated in China. The actual location within China was not established however.

"From January 26 through February 10, 2020, an outbreak of 2019 novel corona-virus disease (COVD- 19) affected 10 persons from 3 families (families A-C) who had eaten at the same air-conditioned restaurant in Guangzhou, China. One of the families had just traveled from Wuhan, Hubei Province, China. On January 23, 2020, family A traveled from Wuhan and arrived in Guangzhou. On January 24, the index case-patient (patient A1) ate lunch with 3 other family members (A2-A4) at restaurant X.
Two other families, B and C, sat at neighboring tables at the same restaurant. Later that day, patient A1 experienced onset of fever and cough and went to the hospital. By February 5, a total of 9 others (4 members of family A, 3 members of family B, and 2 members of family C) had become ill with COVID-19. The only known source of exposure for the affected persons in families B and C was patient A1 at the restaurant.

Restaurant X is an air-conditioned, 5-floor building without windows. The third-floor dining area occupies 145 sq m. each floor has its own air conditioner. The distance between each table is about 1 m. Families A and B were each seated for an overlapping period of 53 minutes and families A and C for an overlapping period of 73 minutes. The air outlet and the return air inlet for the central air conditioner were located above table C.

On January 24, a total of 91 persons (83 customers, 8 staff members) were in the restaurant. Of these, a total of 83 had eaten lunch at 15 tables on the third floor. Among the 83 customers, 10 became ill with COVID-19; the other 73 were identified as close contacts and quarantined for 14 days. During that period, no symptoms developed, and throat swab samples from the contacts and 6 smear samples from the air conditioner (3 from the air outlet and 3 from the air inlet) were negative for severe acute respiratory syndrome corona-virus 2 by reverse transcription PCR.

Virus-laden small (<5 μm) aerosolized droplets can remain in the air and travel long distances, and with COVID-19 particle sizes as small as 1 um, standard technology simply does not work. Potential aerosol transmission of severe acute respiratory syndrome and Middle East respiratory syndrome viruses had previously been reported. However, none of the staff or other diners in restaurant X were infected.

Moreover, the smear samples from the air conditioner were all nucleotide negative. This finding is less consistent with aerosol transmission. However, aerosols would tend to follow the airflow, and the lower concentrations of aerosols at greater distances might have been insufficient to cause infection in other parts of the restaurant.

A more in-depth analysis using simple physics equations of fluid mechanics coupled with the theories of Brownian Motion and statistical analysis seems to suggest the complete picture has not been sufficiently addressed. Based on the kinetic theory of aerosols, particles as large as 8 microns will stay in the air for 300 seconds traveling a distance of 1 meter. With as little air flow in an HVAC system of 1270 ft/minute those

particle sizes can be airborne for as long as 5 minutes which is sufficient time to travel down extremely long lengths of air conditioning duct distribution systems.

Since the retention rate is actually logarithmic or exponential, that dwell time in moving air could be as long as 3 to 4 hours. Air change rates in buildings are dependent on numerous factors including type of construction, building conditioned space use, climatic conditions, ambient pathogen concentration levels and fan system efficiency. Needless to say, airborne particles as small as the COVID-19(SARS CoV2) virus have the ability to circulate and recirculate through a closed indoor environment repeatedly while still viable and maintaining a high rate of infectivity."

The author has established the fact that pathogens, such as and including COVID-19(SARS CoV2), have the ability to maintain infectivity and recirculate for extended periods of time within a closed, controlled building environment. Therefore, it is necessary to conceptualize and formulate a long-term solution.

The solution must be broken down into "materials and methods." Without doubt the critical factor is that you have to provide this permanent protection while building occupants go about their normal daily functions.

These conditions would dictate that the "materials" must be organic based and non-toxic to occupants. Ideally, they would be drug and alcohol free with no added chemicals. Solubility would aid in the application process. With human respiration a factor they must also contain USA-FDA ingredients listed as GRAS (Generally Regarded as Safe) and be non-corrosive. Being non-GMO would be an added plus as would be having no restrictions on disposal.

In 2003 as the SARS outbreak traveled from Hong Kong to Singapore an American scientist (**The Author**) was working in Malaysia with the hospital industry to identify and quantify nosocomial infections and initiate a program leading to an SOP (Standard Operating Procedure) that would be flexible and easily modified based on hospital size, structural design and specialty. Part of that work was the initial development of an organic, plant-based compound with high efficacy and low toxicity. Before work on the Singapore SARS outbreak could get underway it subsided enough to not get involved.

Similar work was again underway in Kuala Lumpur in 2009 when H1N1 made its appearance. By this time research and development of Path-Away Anti-Pathogenic Aerosol Solution® had progressed to field trials. The Malaysian Ministry of Health initiated immediate product testing on the H1N1 virus with absolute success. The product continued to evolve to what it is today and, in that process, has proven effective on more than 100 individual fungi, bacteria, yeasts and viruses. It was recently successfully tested on an approved COVID-19(SARS CoV2) surrogate virus and was redundantly tested in a USA CDC approved lab for specific testing against the current COVID-19(SARS CoV2) strain of the virus. Acceptable kill rate was established at two (2) minutes or less.

With Certified Organic Input and Certified non-GMO status, Path-Away Anti-Pathogenic Aerosol Solution® is so safe, so nontoxic yet so efficacious it is exempt from EPA Registration under FIFR regulations and meets or exceeds numerous USA CFR (Code of Federal Regulations).

On January 29, 2020, the United States Environmental Protection Agency (EPA) activated the "Emerging Viral Pathogen Guidance for Antimicrobial Pesticides" in response to the discovery of

the novel corona-virus, SARS-COV-2. The guidance, issued in 2016, details a process by which companies holding current EPA registrations/exemptions under the Federal Insecticide Fungicide and Rodenticide Act (FIFRA) for certain disinfectant products can promote those products for use against "emerging pathogens" such as the corona-virus. Path-Away Anti-Pathogenic Aerosol Solution® was already declared exempt from this regulation (FIFRA 25(b) as far back as January 12th, 2015.

The key to the efficacy is not so much the individual ingredients but the sequencing of compounding with numerous changes in temperature, pressures, and time parameters. Each ingredient has individual efficacy, but the sequencing process doesn't just provide for the individual efficacies to be additive but exponentially more effective. The resultant product is a near perfect Phytoceutical with broad spectrum efficacy.

Eight years of product field application on a global scale, taking into effect variances in climatic conditions, geographic locations and the severity of the local pathogen matrix have produced this innovative, unique, extraordinary solution to global pandemics.

No material, regardless of how unique, innovative, or effective can provide resolution to a problem without a proper method of application to the problem. The developer of the product was not satisfied with how people were applying it, particularly in buildings. He set out to develop an application process that would provide long term protection and not just emergency protection.

The answer was attacking the problem to mitigate the ability of pathogens to remain airborne and recirculate over and over within the conditioned space without their coming in contact with the anti-pathogenic product and being neutralized. A system was designed, developed and patented that would produce small micron product vaporization which would be entrained with the same air carrying the pathogens continuously throughout the building environmental system. This would put the problem in proximity to the solution.

Prior analysis had determined that since the retention rate in moving air is actually logarithmic or exponential, the dwell time for the pathogen in moving air could be as long as 3 to 4 hours. That is indicative of the pathogens not only traveling within the air distribution system but coming in contact with the entire surface area of that air distribution system. This single factor is the key to permanent protection in buildings. It is the factor still overlooked today.

CURRENT TECHNOLOGIES APPLIED WITH INSUFFICIENT RESULTS.

Current technologies revolve around HEPA Filtration, Ultraviolet (UV) Light, Bipolar Ionization and the current Building Flush technique currently promoted by ASHRAE, American Society of Heating, Refrigerating and Air Conditioning Engineers. While these have a definite place in pathogenic bio-aerosol mitigation their drawbacks limit their results. Let's explore these.

HEPA FILTRATION

Filters have a single prioritized function. They are designed to trap particles passing through them. Those particles may be viable such as Fungi, Bacteria, Yeasts and Viruses. They may also be nonviable particles. Nonviable particles do not contain living microorganisms but can act as a transport mechanism for them. These include things such as dust, dirt, fibers, metal and cloth or chemical compounds. Nonvolatile particles refer mainly to engine emissions.

Design and application of HEPA Filtration is typically done before an HVAC unit is delivered for installation. The dilemma with post installation HEPA Filter application revolves around system fan type and capacity HEPA filters are normally 3-5 times the thickness of standard filters. This presents a problem with the ability of the fan to either push or pull sufficient air through the filter to maintain system operational integrity.

HEPA filters can cause fan cavitation or restricted air flow during the system cooling cycle and will cause insufficient heat transfer ability to the cooling coil resulting in a frozen coil. Freezing of the coil exacerbates the problem as the ice buildup will decrease air flow further. As the filter "loads" with the accumulation of particulate bio burden there is a possibility of air flow breaking viable pathogens from the filter surface and allowing them to re-enter the occupied, conditioned space increasing potential pathogen spread.

HEPA filters are usually rated at 99.95% effective at trapping particles of 0.3 microns or larger. Trapping is the key terminology. Trapping something, particularly a viable, simply holds it in place but does not necessarily kill it. With the COVID-19 droplet nuclei as small as 0.1 micron and the filters inability to kill it, you will simply get recirculation of deadly virus particles to occupants.

ULTRAVIOLET (UV) LIGHT

Ultraviolet light has been in use for many years. This author conducted one of the first UV Light Trial analysis on an installation in Knoxville, Tennessee in the 1980's for a major manufacturer of this type equipment.

There are many spectrums of UV and you need the most powerful to ensure you kill the most dangerous pathogen. When you get approximately 1 meter away from a UV light the drop off in efficacy is exponential. In a ducted HVAC system UV light does not radiate down a long duct, around a corner, up a riser and down into multiple diffuser outlets. Buildup of "bio-burden" (particulates) on the bulb will decrease efficacy and bulbs will need to be changed regularly to make up for loss of efficacy and efficiency.

The operating condition in an HVAC unit known as "bypass air" is essentially air that did not come in contact with the coil and bulb output. All commercial applications are mandated to include fresh air makeup. Since UV light does not kill everything on the first pass over it you will always have pathogens that do not come in contact and thereby remain viable.

BIPOLAR IONIZATION

Bipolar Ions are essentially plasmas. Plasmas are created by the ionization of atoms and molecules. The mechanism and devices used to create plasmas are either through the use of electric arcs or plasma torches, which require a very high current source. Plasmas, often referred to as the 4th state of matter, are charged or ionized particles and as such are governed in their movements by the Coulomb's Law of Electrostatic forces, where opposite charges attract and like charges repel each other.

These forces are also dictated to by the inverse square law of distance of separation. The closer each particle is to the other charged particle, the greater is their forces of attraction or repulsion.

A natural occurrence of a plasma process is similar to thunder and lightning. Those arc discharges will have to be created in every HVAC duct where the Bipolar Ion needle point

discharges are installed. Ions or plasma particles are not usually stable and often recombine to become neutral atoms and molecules in very short durations.

In the Bipolar Ions devices used to decontaminate a building, an appreciable fraction of these Ions will recombine either in the ductwork or shortly upon entering the building space. Those recombined Oxygen and Nitrogen atoms and molecules can lose their effectiveness in combating the Covid 19 Viruses. Any wall or surface which have particles of opposite charges to the generated plasmas will be attracted to them and hence a portion of these plasmas will stick to the walls or surfaces, instead of staying in the airspace to fight the Covid 19 viruses and/or other pathogens.

The Coulombic forces are very much larger than gravitational forces, hence these ionized plasma particles that are attracted to the surfaces which are of an opposite charge, such as electrons will not readily fall towards the ground through the airspace, again reducing the efficacy in fighting the Covid 19 viruses and/or other pathogens in the air.

Using the air in a ductwork which has a significant amount of Oxygen, Nitrogen, and Carbon Dioxide could generate a significant amount of Oxygen plasmas which has a good potential of formation of Ozone (03) over an extended period of time, such as in classrooms in schools and colleges, hotels, convention centers, restaurants and other places where such occupancies are over many hours throughout the day.

Ozone can be toxic to humans, especially in the amounts required to kill airborne pathogens. These machines have also been identified to produce other volatile compound biproduct such as formaldehyde, acetone and toluene, irritants that can cause lung and nerve damage with chronic exposure. Plasma generation devices are expensive to manufacture and market and as such Bipolar Ions machines are costly when compared to the current Nobel Nominated breakthrough technology. Bipolar Ionization can create a magnetic field which could damage other electronic devices in the area.

Bipolar Ionization can take as long as 472 minutes to "possibly" do the same thing as the current Nobel Nominated Breakthrough technology. It is the author's position that Bipolar Ionization is not a workable device to eliminate Covid19 viruses in a room.

It might be acceptable to use Bipolar Ions to clean pollutants and other viruses which are not deadly or that infectious. To clean a room in almost 8 hours is not what schools could live with. The operating hours of a school are usually from 8am to 3pm, 7 hours a day. After installing such machines, masks and social distancing will still be required.

According to Delphine Farmer, atmospheric chemist at Colorado State University who has studied ionization technology and produced peer reviewed scientific literature on the subject, "None of these devices have been proven to work. Anyone who understands the chemistry would say you should be very wary of using them."

BUILDING INDOOR AIR FLUSHING

This is a new approach suggested by some current HVAC Engineers. There is no significant data available to warrant this but there is historical data to refute it. The cooling load of any air-conditioned building has two components namely that of the sensible load and the latent load in the building. The Physics of Psychometrics ensues that any additional flushing of a building and

thus, replacing that volume of air with the introduction of outside air will greatly increase the latent cooling load requirements in any air- conditioned building.

When water vapor remains in the air as humidity, it makes the temperature feel warmer. As the humidity is lowered the air feels cooler. As of late many HVAC and health professionals have attempted to use additional outside air and filtration as a remedy to combat the Covid 19 virus in air-conditioned buildings. This approach is not exactly feasible since additional air intake will only increase the amount of humidity in the building and hence raise the temperature of the building during the summer months by increasing the additional latent load of the building thus requiring the air conditioner to operate at a higher frequency than before.

The higher frequency of operation will require additional amounts of electricity. Furthermore, the HEPA filters do not eliminate the Covid-19 virus, rather it would only try to filter out those viruses at the return ductwork. This approach will not do anything to eliminate the remaining Covid-19 virus in the building.

Should any virus be introduced into the building during the downtime in which the air conditioner had cycled off, the HEPA filtration will not be able to provide any protection against the virus in the building air space.

Another disadvantage in bringing in additional moisture and humidity into an air-conditioned building is the higher amount of latent load which will lead to a lower level of comfort for its occupants. It will also provide a situation where any viable fungi achieve maximum ability to replicate.

Flushing of conditioned air, heated or cooled, and replacement with fresh outside are does not take into account possible and potential airborne pathogens in that air. When a building acts as a "heat/cool sink" to maintain residual structural temperature that the owner spent money producing it would be foolish to start all over again with a fresh load of outdoor heated or cooled air that becomes a secondary energy expense. Flushing a building daily is a poorly thought-out remedy.

NOBEL PRIZE NOMINATED TECHNOLOGY

The M3 System® Protection Module was conceptualized, designed and engineered to attack the causal agent of deadly viral spread. Developed by a globally recognized Engineer, Scientist and Nobel Prize Nominee for his work specifically related to COVID-19(SARS)CoV-2, it is available for application to Commercial, Residential, Industrial and/or Institutional structures.

Utilizing the Brownian Theory of Motion, defined as, "The erratic random movement of microscopic particles in a fluid, as a result of continuous bombardment from molecules of the surrounding medium" our team has developed a way to use this principal to micro-infuse millions of molecules of our organic, extremely high efficacy, botanical based product into and onto the surfaces of the buildings HVAC system so that any pathogenic bioaerosols such as viruses, fungi, bacteria, yeasts and non-viable particulates such as pollen will come into contact with each other through circulation and recirculation of the air in the occupied space.

When a molecule of high efficacy contacts a unit of viability such as a virus, fungal, bacteria or yeast the viable unit's ability to reproduce is disrupted and destroyed. Similarly, non-viable items such as pollen have their capability to be allergenic negated.

The USA FDA approved binding agent will remain in an equal percentage in individual molecules per molecule as in the parent droplet. This binding agent allows aggregation of pathogens that come in contact with it. The result is that the aggregation will allow the efficacy to affect disintegration of combined particles.

These particles will now become large enough that even a HEPA filter will fulfill its function of trapping them thereby removing them from recirculation to the conditioned space. Nonviable and nonvolatile particulates will also succumb to this aggregation process and be removed from recirculation by the system filtration. This has been proven out in numerous installations by building engineers seeing an increase in filter replacement.

The average adult breathes in excess of 50 cubic meters of air per 24-hour period. Dry air is composed of approximately 78% nitrogen, 21% oxygen, 1% argon, carbon dioxide, water vapor and a minute number of other gases. Non-controllable factors contribute to that healthy air also containing a very large variable amounts of viruses, fungi, bacteria, yeasts, plant pollen and numerous other potentially harmful disease carrying particulates.

The key to keeping building occupants safe and healthy is the ability to provide Proactive Pandemic Protection automatically, constantly and safely with innovative technology that is "Organic based, Non- GMO, Tested, Proven and Approved."

Systems are in place in numerous locations and applications and functioning flawlessly. Results are beyond expectation and satisfaction is universal. Continued innovation is part of the program and preparation for future incursions by deadly pathogens is a hallmark of this work.

THE FUTURE

Will we continue to vacillate day to day, week to week, month to month and possibly for years to come based on the premise that, "Well, we've never done it that way before." Will we embrace innovation and innovative thinking? Will we get to wearing multiple masks after continued "boosters?" The future is bright but also uncertain.

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