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Can Bat-Gown, Bat-Sack, Bat-Box Protection Counter Bat-Human Contraption? An Envisaged Idea Triplet

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Abstract

Dose of exposure cannot be downplayed whether it is the dose of inanimate chemicals, animate bacteria or viruses somewhere-in-between therein. Therefore, as high infectivity of clinical scenarios unravel during COVID-19 pandemic, Bat-Gown, Bat-Sack and Bat-Box as envisaged idea triplet may play a role to counter Bat-Human contraption like SARS-CoV-2 in the healthcare environments.Â Â Â

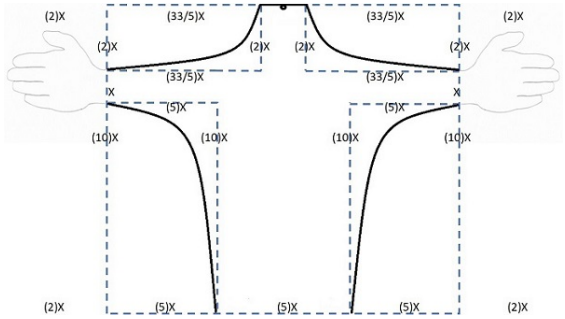
Envisaged Idea Triplet

During ongoing COVID-19 pandemic, it is routinely claimed that dose of SARS-CoV-2 exposure may not be scientifically relevant in evolution of COVID-19 symptomatology [1]. Contrarily, it is my belief that dose of exposure cannot be downplayed whether it is the dose of inanimate chemicals, animate bacteria or viruses somewhere-in-between therein [2]. During health promotion strategies for infection control, the core concept may be to reduce the dose of exposure to â€œhomeopathicâ€• levels because although there may be neither a direct-positive effect (treatment-effect) nor a direct-negative effect (adverse-effect) of exposure at â€œhomeopathicâ€• level, this â€œhomeopathicâ€• dose of exposure may still function in the role of antigenic effect to induce bodyâ€™s innate and enhanced immune response that may counteract not only against the inciting antigens but also against other exogenous or endogenous antigens [3]. Hereby, to counter high infectivity of clinical scenarios as unraveling during COVID-19 pandemic [4-5], comes the role of my below-mentioned an â€œimperfectâ€• envisaged idea triplet. Interestingly, other unrelated â€œnear-perfectâ€• strategies reduce doses of exposure up to â€œ99.97%â€• germs and may still be leaving behind at least â€œ0.03%â€• germs to potentially act as antigenic exposure required to keep our immune systems reactive, responsive and healthy [6].

Bat-Gown (Figure 1)

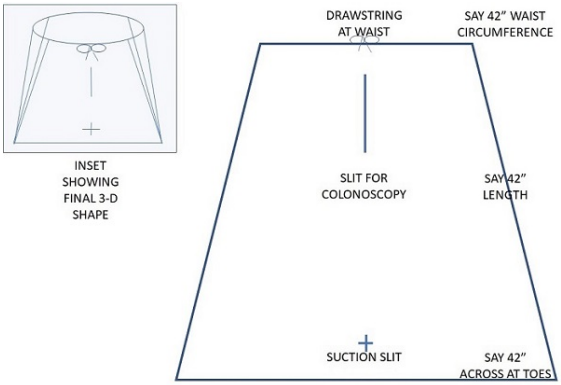
at-Gown may be simply cut out from transparent vinyl plastic as a coverall for healthcare workers (HCWs) wearing N-95 filter converted snorkel-mask as personal protective equipment (PPE) [7]. A small circular cut as N95 filterâ€™s outlet at the top of Bat-Gown will be a must to allow access to ambient air because Bat-Gown is to be worn only over snorkel-mask based PPE. To cut out Bat-Gown, an analogous online video by Susan Evans may help as guide [8]. Essentially, Bat-Gown may initially need folding of 13X long and 19X wide vinyl plastic dual sheets in the half, widthwise, wherein X is comfortable adult arm diameter (~5 inch). Thereafter, Bat-Gown may be cut out along the solid curved black lines and imprinted handprint allowing the integration of head-cover, gloves and body covering as one-unit leaving the need only for shoe/boot-covers to be donned separately. After unfolding, dual sheetsâ€™ edges may be laminated with heated source leaving only the lower (anklesâ€™ level) margin open for donning and doffing Bat-Gown drawn over HCWâ€™s head. For understanding the doffing of Bat-Gown, an analogous online video of T-shirt doffing may help as guide demonstrating how to doff over the head by crossing the hands to grasp the contralateral lower margins and thus avoiding contamination while doffing [9]. It may be worthwhile to keep vinyl plastic not too thin so that it may not collapse creating trapped air pockets between Bat-Gown and HCWâ€™s clothes. Bat-Gownâ€™s baggy shape at waist level may allow freely flowing ambient air ingressing/egressing at open anklesâ€™ level for HCWâ€™s safety and comfort. Bat-Gownâ€™s baggy shape at armscye level (dolman sleeve) may allow HCW to easily draw in and out hands during respectively donning and doffing Bat-Gown. Moreover, dolman sleeve may give HCWâ€™s hands easy access into their clothesâ€™ pockets for making or attending emergency phone calls without needing to doff Bat-Gown. There will be few limitations with Bat-Gown. Bat-Gown may only be worn for short periods over snorkel-based PPE which may have carbon dioxide accumulation concerns if worn for longer periods [10]. Free flowing ambient air

circulating beneath Bat-Gown may expose HCWsâ€™ clothes to contamination by airborne particles and pathogens contained in the circulating ambient air. Cost-effective to make and easy to don-doff Bat-Gown can never replace Hazmat suits [11]. Bat-Gown enclosed sound-dampening environment may warrant HCW to wear microphone under mask (MUM) or microphone under gown (MUG) and audio-amplifier under gown (AUG). It is unclear if Bat-Gown will still be easy to make, don or doff once vinyl plastic may get replaced with nonwoven opaque fabrics leaving allowable transparency only around face.



Bat-Sack (Figure 2)

As inspired from potato sack races of childhood [12], Bat-Sack may create an enclosed environment for patients undergoing lower gastrointestinal endoscopy wherein insufflated gas has potential to egress as aerosolized fecal material containing SARS-CoV-2, intraoperatively as well as postoperatively [13]. To enclose egressing gas and direct its controlled exit into High-Efficiency Particulate Air (HEPA) filtration unit in procedure room as well as in post-procedure recovery room, Bat-Sack made of transparent vinyl plastic may come in handy with self-collapsible slit for lower gastrointestinal endoscopeâ€™s access and another slit for surgical smoke-â€œaerosolâ€•-evacuator. The few limitations with Bat-Sack will be that (a) it is unclear if there will be a fire risk with egressed bowel gas and insufflated gas admixtureâ€™s entrapment for suctioning, and (b) the time to completely empty gas egressed into Bat-Sack will depend on the suction power of surgical smoke-â€•aerosolâ€•-evacuator [14]. Interestingly, if Bat-Sack and HEPA filtration units will be logistically difficult post-procedure, patients may don diapers until ready to wear their own undergarments to adsorb/absorb â€œaerosolsâ€• egressing after lower gastrointestinal endoscopy procedures [15].



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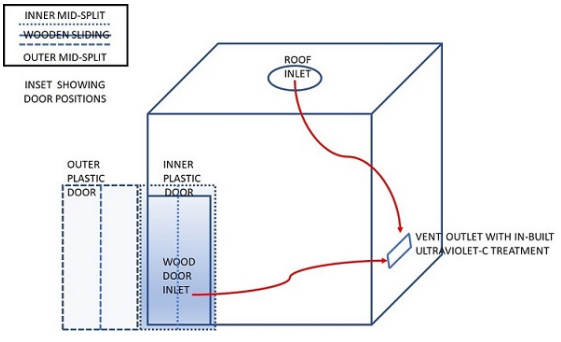
Bat-Box (Figure 3)

As the question lingers to balance positive and negative pressure rooms [16-17], I believe that COVID-19 pandemic may be the right time to convert healthcare rooms into â€œneutralâ€• pressure rooms that I named as Bat-Box. In Bat-Box, intentional positive â€œingressâ€• air flow from roof and accidental positive â€œingressâ€• air flow from wooden door may coalesce at floor level before egressing through strongly negative â€œvacuumâ€• pressured near-the-floor vent outlet. Herein, the egressing air may be treated with bactericidal and viricidal strategies like ultraviolet-C or thermodynamic sterilizing system before getting dispersed into city atmosphere [18]. To improve the seal around sliding wooden door, transparent vinyl plastic doors may be integrated on both sides of the wooden door. Being taller than wooden door, the plastic doors may be accommodated and slid inside dedicated floor grooves to ensure better seal against air movement across door assembly. These sliding plastic doors may additionally have mid-splits to allow healthcare personnelâ€™s emergent entry and exit without breaching neutral pressure inside Bat-Box.



Summary

In summary, Bat-Human contraption like SARS-CoV-2 may warrant feasibility explorations and safety investigations into the potential of envisaged idea triplet (Bat-Gown, Bat-Sack and Bat-Box) to help patientsâ€™ and personnelâ€™s personal protection.

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