Lessons learned from managing COVID-19 risk at workplace - a perspective from a safety/risk practitioner

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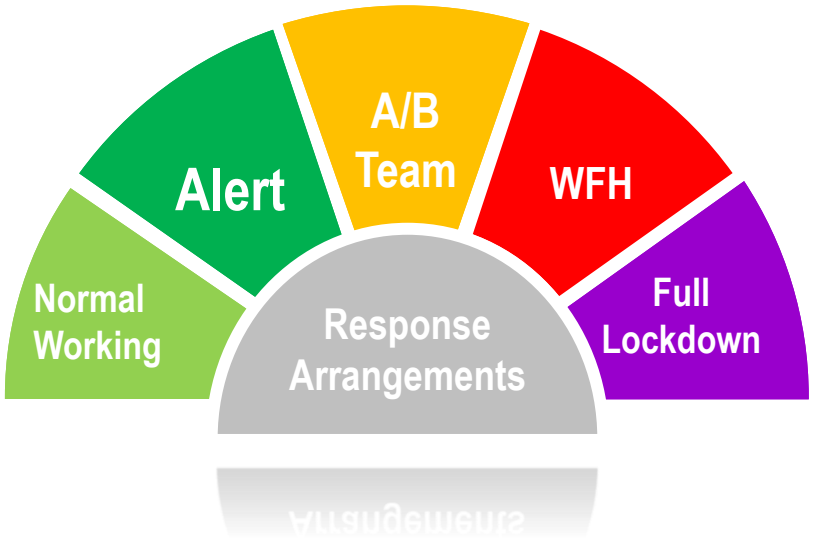
Vincent Ho

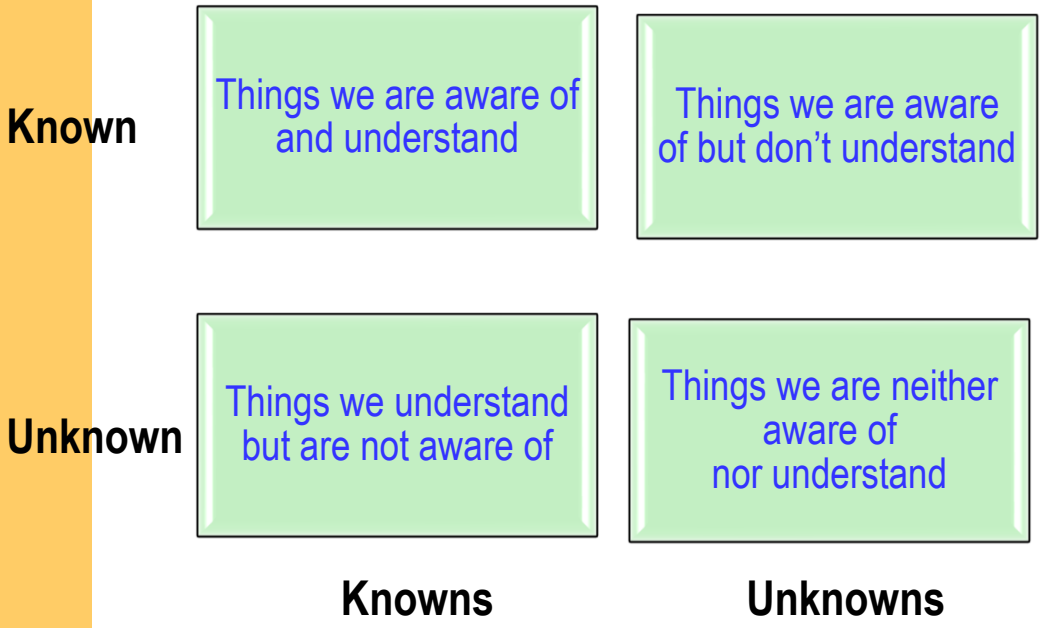
HKOSHA Member

What seems to work and what may not work well

- What we know vs what we don't know
- How to use what we already know
- Mask or no mask?
- Which technology works?
- Enhance, learn and regroup
- I don't know where this is going to, let's see….



We have been facing… the biggest *unprecedented* challenge experienced by any industry worldwide in our lifetime



- *Known knowns:* things that we know (i.e are aware of) that we know. We know that health and hygiene is an essential component in our SMS
- *Known unknowns*: things that we know that we don't know. We knew an unknown infectious disease can cause a significant impact to our businesses; we did not know what and when
- *Unknown knowns*: Things we don't know that we know
- *Unknown unknowns*: Things that we don't even know what we don't know

Source: US Secretary of Defense Donald Rumsfeld during a Pentagon news briefing in February 2002

Which one worries you the most?

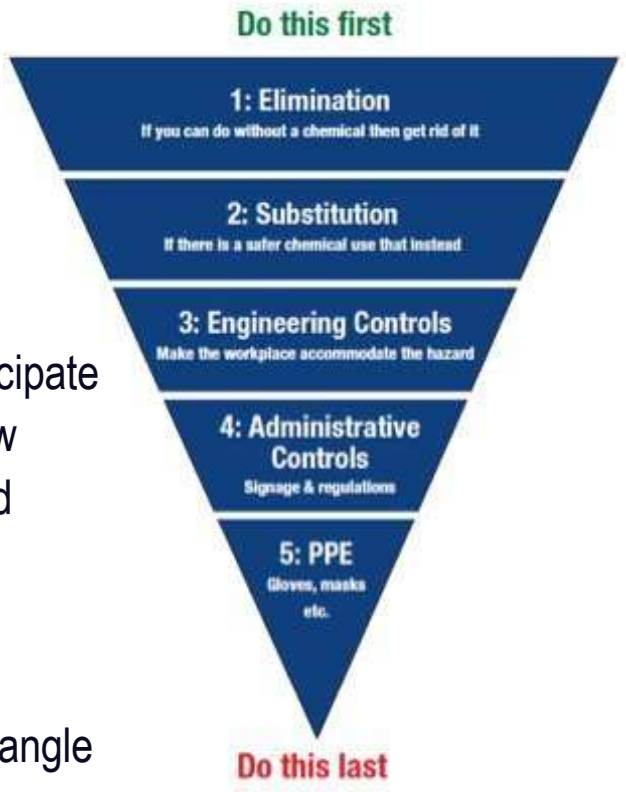
Which one you want to explore more?

No clear cut between these boxes, don't try to find a black and white boundary

ISO31000: Risk is "the effect of uncertainty" on objectives. This effect can be both positive or negative

What can we do under uncertainties?

- *Known knowns* seem to pose less of a risk, as they are facts we are confident in. Risk areas/ Examples from COVID-19 management
  - We think we know but we actually don't
  - Overconfidence
  - Lack of motivation to explore more safety/life saving initiatives
- *Known unknowns* imply risks you are aware of, we can anticipate but we are uncertain of the timing or impact. Since we know they will hurt us, we can measure the risk, understand it and investigate more to make this a *known known*
  - Need R&D, investment
  - Know the worst-case consequences
  - More or less we can address through the risk control triangle



To a certain extent, areas that we can risk-manage

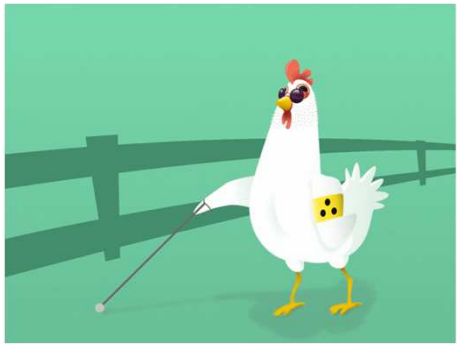
What about the unknown unknowns?

- *Unknown unknown*s are unexpected or unforeseeable conditions, which some people may think they pose a potentially greater risk simply because they cannot be anticipated based on past experience or investigation, and therefore can't plan, analyze or take actions to mitigate them. E.g., blind spots, Black swan events
  - In Probabilistic Risk Assessments, we model expert opinions for unknown events and attempt to address *Unknown unknown*s using the tail ends of uncertainty curves
  - Aleatoric and epistemic uncertainty
  - Subway uncertainty vs coconut uncertainty
- Since we don't know what we don't know, we can manage through risk absorption
  - Be flexible and adaptive while keeping operations and services priority
  - Fast response according to situations
  - Be prepared, be resilient

Be resilient is the key to ride through the storm

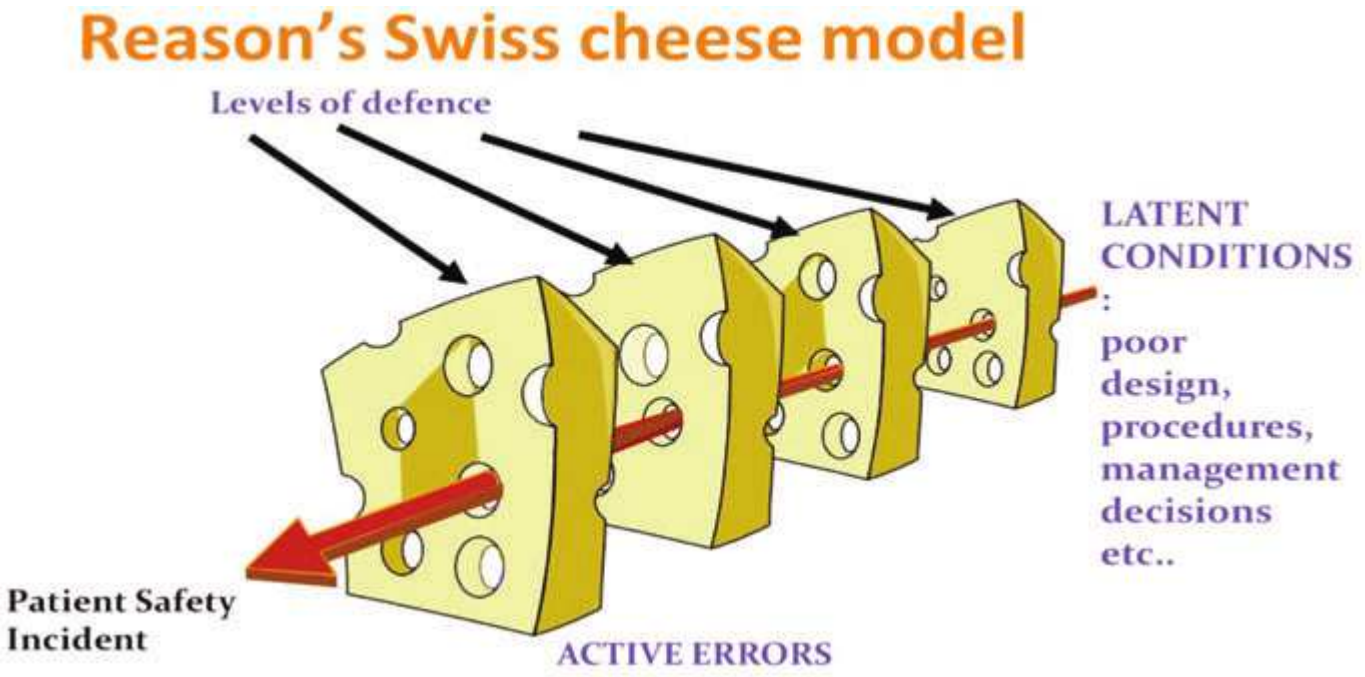
What I am most interested in ….

- *Unknown knowns* are risk that often overlooked or just misinterpreted. The impact maybe unknown but existence is known; e.g., untapped knowledge, planning & communication errors
- Some say these are the risks an organization is aware of but is disregarding them, either intentionally or unintentionally. Unknown knowns are not acceptable from a risk management perspective – if a risk is known, everything must be done to manage it
  - Elephant in the room
  - Rhino in the room
- This is the area we OSH practitioners can help organisations the most during these difficult times by using our knowledge in managing OSH risks
- We actually know quite a lot to manage this COID-19 health risk

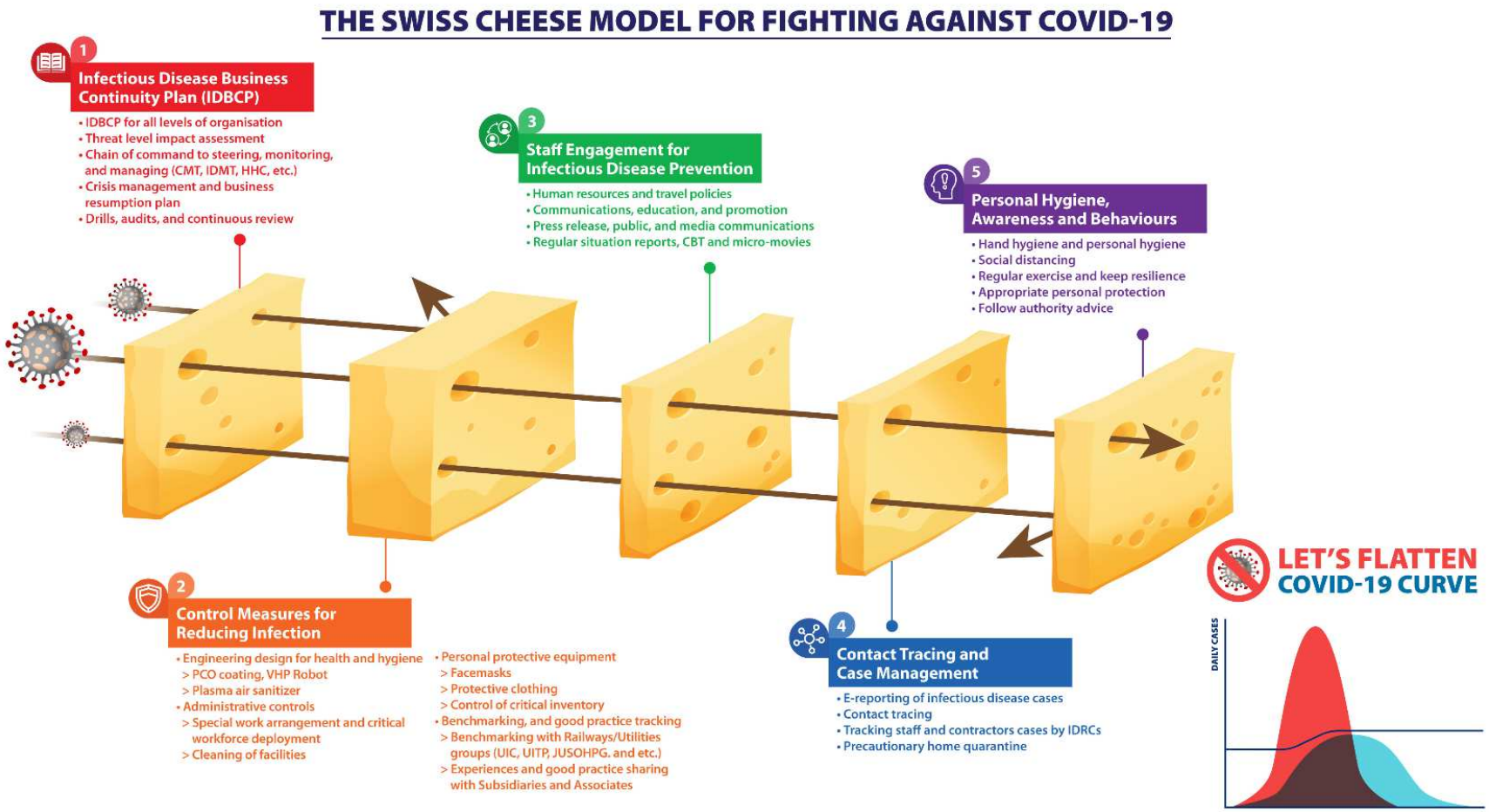


Where there is risk, there is opportunity

We have learned of James Reason's' the swiss cheese model of accident causation



We can apply this to the management of COVID-19 risks… unknown knowns



This well-known model helps explain the various safety barriers we put in place to address COVID-19 risks –workers can understand they are part of the barriers and need to play their own parts

We know the 7 Golden Rules of Vision Zero

1. Take leadership – demonstrate commitment
2. Identify hazards – control risks
3. Define targets – develop programmes
4. Ensure a safe and healthy system – be well-organised
5. Ensure safety and health in machines, equipment and workplaces
6. Improve qualifications – develop competence
7. Invest in people – motivate by participation

These rules can be used to address response management by addressing the safety, health and wellbeing of our workers

Mask or no mask? Which mask?

- Level 1 or Level 2? Level 3?

Type/ Level	Examples of Use
ASTM LEVEL 3 Used where heavy to moderate amounts of fluids, spray and/or aerosols are produced	Complex oral surgery (e.g., Implant placement, crown preparation)
ASTM LEVEL 2 Used where moderate amounts of fluids, spray and/or aerosols are produced	Limited oral surgery (e.g., endodontic, orthodontic), appendix removal, minor/medium surgery
ASTM LEVEL 1 Used where low amounts of fluids, spray and/or aerosols are produced	Impressions, operatory cleaning, patient exams, endoscopic surgery

Level 2/3 are generally used for intrusive procedures involving direct fluid contact

Level 1 masks are the standard procedural masks used by medical staff

- The rating for Level 1 refers to the relatively low risk of fluid exposure, not "low" protection to general use
- The higher the ASTM Level, the higher the delta P, makes it harder to breathe through
- Per Medical Advisor, "*Level 1 mask is well adequate for general public not involved in medical work*…" that should work for most situation

ASTM and other equivalent standards (e.g., EN14683) are testing standards for quality assurance purposes and recommendations on mask selection. There is no standard/ certification requirements for use of masks even for medical procedures

What is Hong Kong Government's requirement?

- HK Centre of Health Protection (CHP) does not provide technical specifications for masks
  - Prevention and Control of Disease (Wearing of Mask) Regulation: *mask (口罩) includes any covering designed or made to be worn over the nose and mouth to provide the wearer protection against infections or air pollution*
  - CHP guideline "Use Mask Properly": masks should have 3 layers*
  - There are no specific requirements on meeting any of the ASTM standards
- The disposable masks issued by HKG to general public are produced in HK, meeting ASTM level 1 requirements

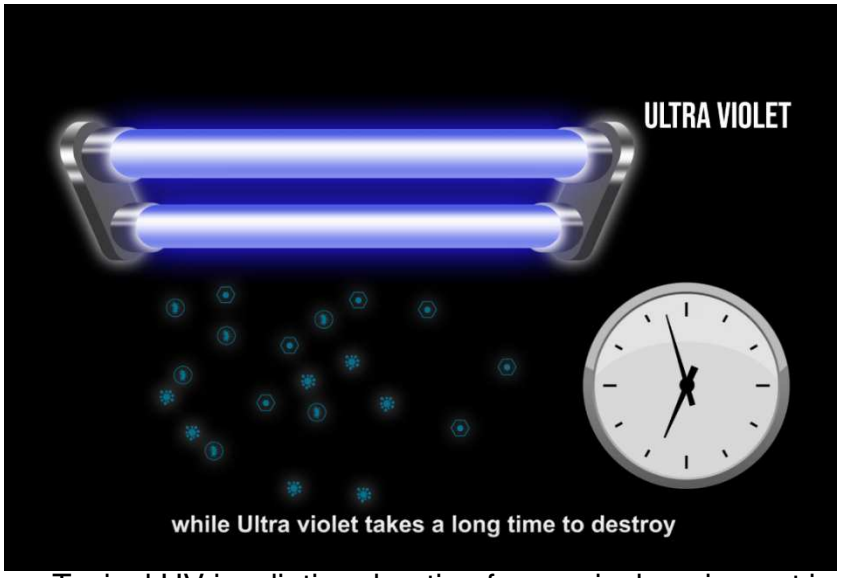
*3 Ply with requirements as follows: "*a mask should include an outer fluid-repelling layer, a middle layer serves as a barrier to germs, and an inner moisture-absorbing layer. Mask without the above-mentioned three-layer features is not recommended as it cannot provide adequate protection against infectious diseases transmitted by respiratory droplets*"

Which ~~technology~~ gadget works? – Purely my personal opinion….

- Entrance temperature measurement
- Cleaning robots
- Personal ion portable air purifiers
- UV light device: handrail sterilizer, air cleaner
- Plasma machine

How long do I need for the UV light to work?

- Ultra violet (UV) light requires long irradiation on germs that is impractical for air disinfection
- Diminishing intensity over distance
- Shadowing effect (e.g., dust on surface) render UV disinfection useless
- UV Dose = UV Intensity (μW/cm²) x Exposure Time (seconds)



Typical UV irradiation duration for surgical equipment is over 2 hours – too slow for air disinfection

ULTRAVIOLET DOSAGE

Germicidal lamps provide effective protection against microorganisms. A small cross-section is shown below.

ORGANISM	ALTERNATE NAME	TYPE	DISEASE	DOSE*
Corynebacterium diphtheriae	*C. diphtheriae*	Bacteria	Diptheria	6,500
Legionella pneumophila	*L. pneumophila*	Bacteria	Legionnaire's Disease	12,300
Mycobacterium tuberculosis	*M. tuberculosis*	Bacteria	Tuberculosis (TB)	10,000
Pseudomonas aeruginosa	*P. aeruginosa*	Bacteria		3,900
Serratia Marcescens	*S. marcescens*	Bacteria		6,160
Staphlylococcus aureus	*S. aureus*	Bacteria		6,600
Staphlylococcus epidermidis	*S. epidermidis*	Bacteria		5,800
Adeno Virus Type III		Virus		4,500
Coxsackie A2		Virus		6,300
Influenza		Virus	Flu	6,600

* Nominal Ultraviolet dosage (μWSec/cm²) necessary to inactivate better than 99% of specific microorganism. Consult factory for more complete listing.

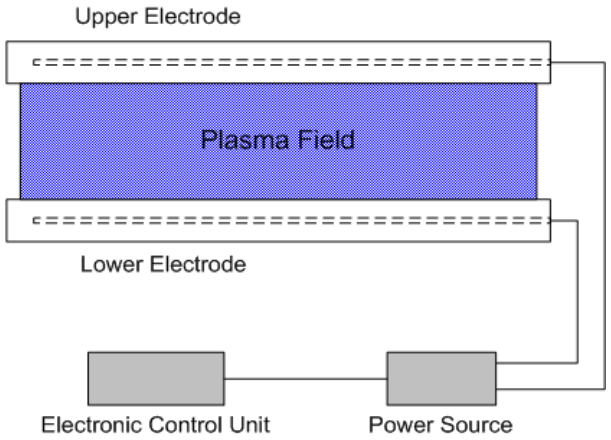
Influenza 6600 (99%) = 1mW/cm2 x t
T = 6600/1 = 110 min

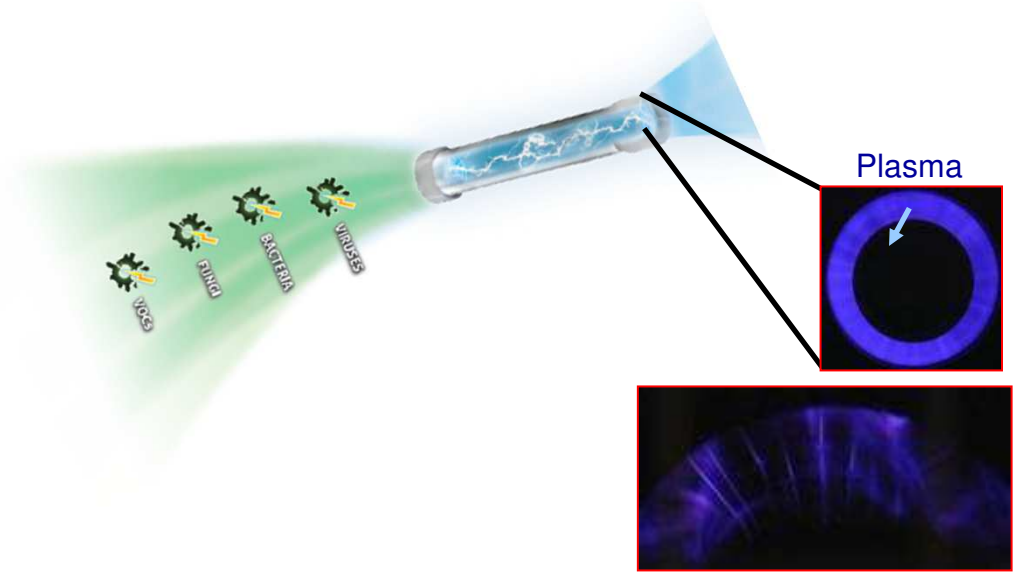
Influenza 6600 (99%) = 46mW/cm2 x t
T = 6600/46 = 143 s

What I have found that works

Plasma Air Sanitization Technology

Electrical Generation of Plasma





- A high voltage is applied to the electrodes to create plasma
- Thousands of tiny lightening created inside the plasma device destroy airborne microbes and VOCs
- Plasma stays inside the device, cannot escape into the living environment
- Can achieve 99% disinfection efficacy in <0.1 seconds of plasma treatment

Intense ionized gas field shatters the pathogenic microbes & VOC

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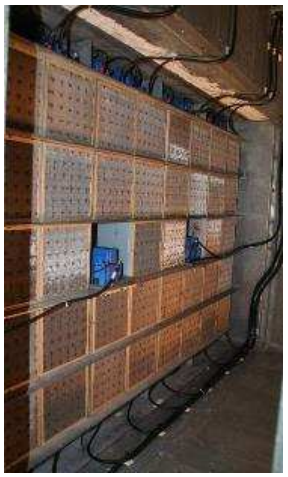
Centralized AHU Installation
(Control Tower, Hong Kong International Airport)

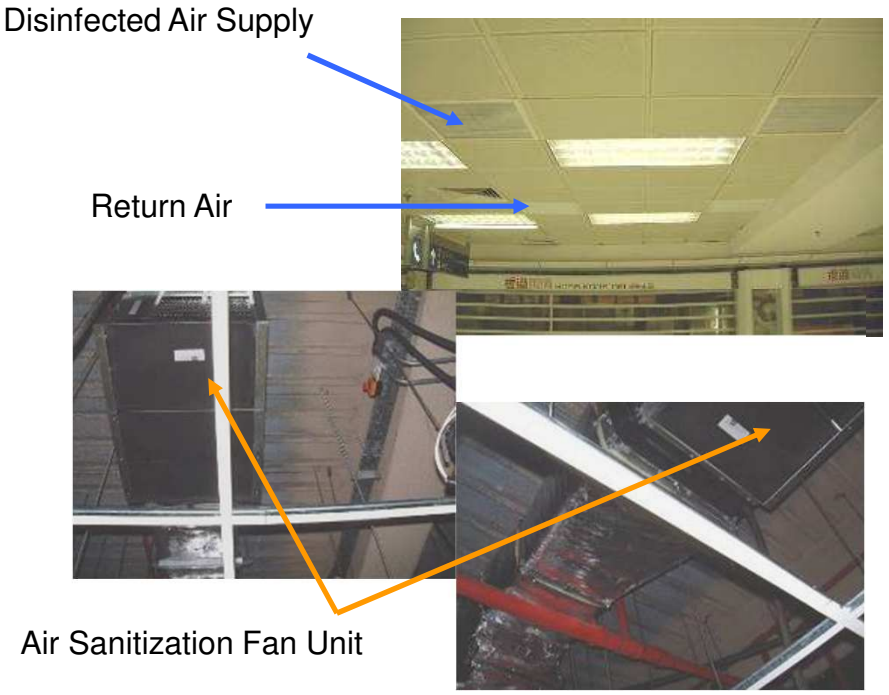
Inside of AHU before installation



Air Disinfection Devices mounted inside the AHU

Outside of AHU after installation

Fancoil Type Installation
(MTR Lo Wu and Lok Ma Chau Stations)



https://www.air-halo.com/

htsui@a-onetech.com.hk

Enhance, learn and regroup

- What is our bread and butter?
- What do we do when we get back to normal?

Use the opportunity to better equip ourselves in meeting new challenges ahead of us – Certification for OSH professional

Use the time to upgrade?

- What is certification and why is it important?
- Identify the professional certification for you
  - Certified Safety Professional® (CSP®)
  - Certified Management Specialist® (SMS®)
- Eligibility requirements
  - BCSP Qualified Credentials: CMIOSH

What is Certification?

Certify – to attest authoritatively as meeting a standard.

Webster's Ninth Collegiate Dictionary

- Professional credential
- Competency assessment
- Third-party validation of the four 'E's
- Voluntary process
- Evaluates individuals against a standard

- Requires continuing education and professional development (recertification)

What is Certification?

It is NOT:

- License to practice
- Permanent
- Membership
- Certificate of completion

Why is Certification Important?

- Demonstrates **competency**
- Advances safety **professionalism**
- **Competitive** advantage
- Demonstrates **credibility**
- Sets **standards**
- **Pay** and mobility
- Contract **Qualifications**

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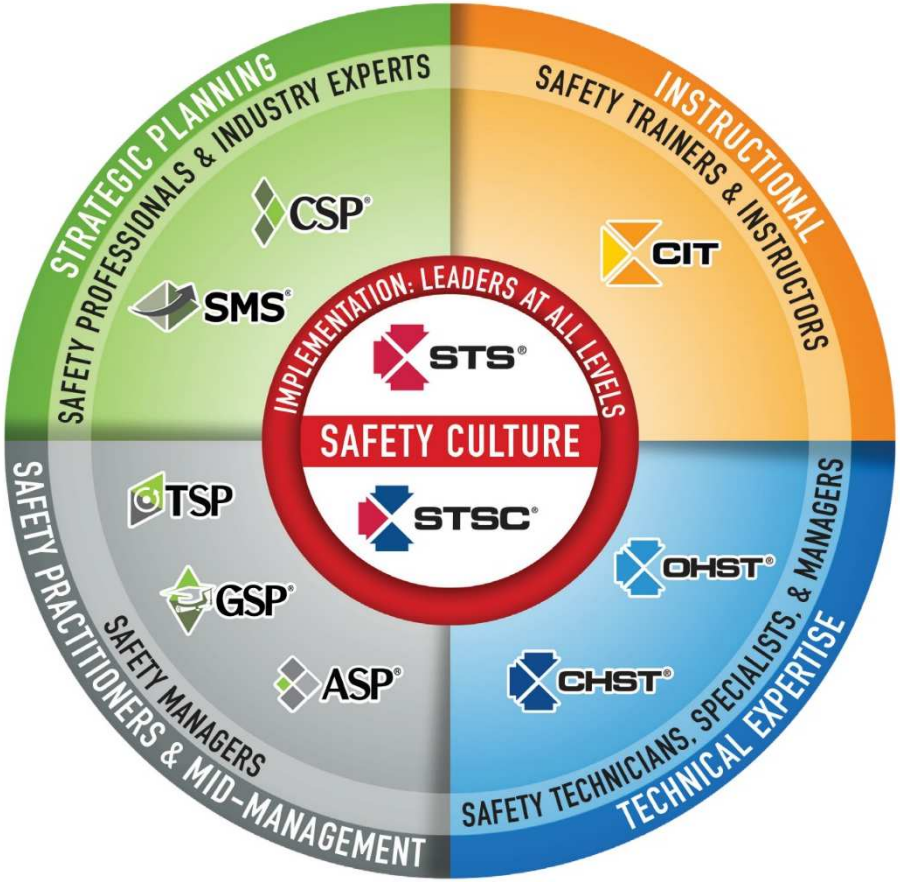
Which Certification is right for me?



Professional Certifications

Certified Safety Professional®

The premier certification in the safety profession, covering a wide range of SH&E practice disciplines.

Certified Safety Professional® (CSP)

- **Minimum Academic Requirement**
  - Accredited* bachelor's degree in any field
- **Experience Requirement**
  - At least four (4) years of experience where safety is at least 50%, preventative, professional level with breadth and depth of safety duties
- **Qualified Credential**
  - Hold the ASP or hold an approved equivalent
- **Ethics**
  - Commitment to the BCSP Code of Ethics

*Degree Programs and School must be accredited. An accredited school is one that is recognized by the US Department of Education or the Council of Higher Education Accreditation (CHEA).

*When applying for the CSP with a degree from a college outside the United States, that degree will be evaluated for US equivalency.

Waivers of ASP Examination

Organization	Credential/Diploma
American Board of Industrial Hygiene (ABIH)	Certified Industrial Hygienist® (CIH®)
Board of Canadian Registered Safety Professionals (BCRSP)	Canadian Registered Safety Professional (CRSP)
Board of Certified Safety Professionals (BCSP)	Graduate Safety Practitioner (GSP)
Board of Certified Safety Professionals (BCSP)	Transitional Safety Practitioner (TSP)
Board/Department of Technical Education, State Governments of India	Diploma/Certificate in Industrial Safety
Institution of Occupational Safety and Health (IOSH)	Chartered Member of IOSH (CMIOSH)
International Training Centre of the International Labour Organization (ITC-ILO)	Master in Occupational Safety and Health
National Examination Board in Occupational Safety and Health (NEBOSH)	National and/or International Diploma in Occupational Health and Safety
Singapore Institution of Safety Officers (SISO)	Member SISO
State Administration of Work Safety (SAWS), China	Certified Safety Engineer (CSE)
U.S. Army Combat Readiness Center (USACRC)	Professional Certificate in Safety and Occupational Health (CP-12)

Safety Management Certification

Safety Management Specialist®

Validates the experience of safety practitioners with more than 10 years of experience, with or without a college degree

Safety Management Specialist® (SMS)

Experience Requirement

- 10 years of safety management experience, 35% of job tasks related to management of safety-related programs, processes, procedures, and personnel

Ethics

- Commitment to the BCSP Code of Ethics

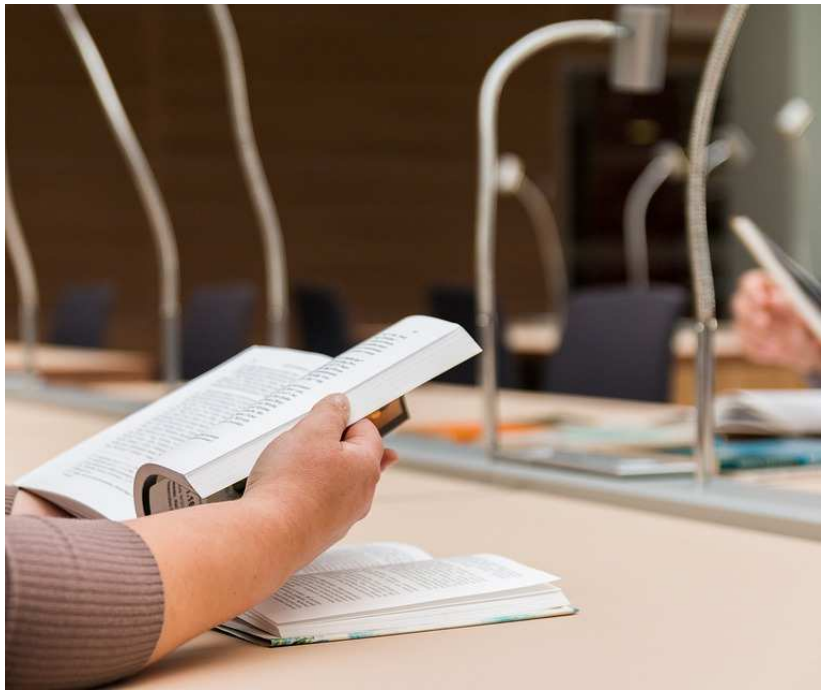
SMS®

The Certification Process

1. **Choose which credential is right for you and apply online**
2. **Determine eligibility**
3. **Submit application**
4. **Purchase exam**
5. **Schedule exam**
6. **Sit for exam**
7. **Maintain certification**
   - Annual renewal fee
   - Recertification

Preparing For Your Exam

- Know your strengths and weaknesses
- Have an examination preparation plan
- Develop a test-taking strategy



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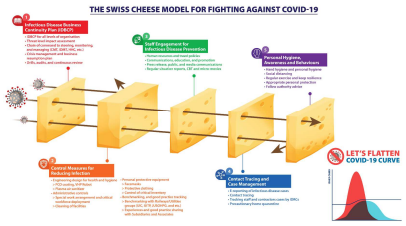
Takeaway



Use what we do best to tackle challenges

Be resilient

Continue to learn and adapt

Communicate

Communicate

Communicate

Questions?

Thank You

End