Reducing pathogen load in the indoor environment is an important infection control measure, particularly when some of the building occupants are suffering from respiratory infections. Implementing basic hygiene practices such as mask wearing, especially for persons suffering from respiratory infections, and alcohol hand rubbing together with an assiduous cleaning schedule will help to keep the quantity of pathogenic microbes in check.

Enhancing ventilation system performance will further reduce pathogen load in the indoor environment. However, it is worthwhile, first of all, to revisit the issue of transmission modes. Microorganism-containing particles released during coughing and sneezing events are “poly-dispersed” – meaning there are aerosols of a wide range of sizes. The larger droplets will fall to the floor within a short time, while the smaller aerosols will remain suspended in air. Furthermore, some of the droplets can be re-suspended due to eddy air current in the environment, or desiccation of the droplets which makes them smaller and less likely to settle. Together with the change in survivability with time and environmental conditions, the pathogens in aerosols may display a continuum of airborne transmissibility. One needs to always remember that “droplet” or “contact” transmission versus “airborne” transmission is nothing but an artificial delineation. Microorganisms do not observe these man-made definitions. Therefore, even though the medical community tends to think that certain respiratory pathogens "are only transmitted by droplets or contact”, one should always pay attention to the possibility of “limited” airborne transmission, especially in the case of emerging diseases with uncertain health consequences.

Different buildings may have different ventilation systems. It is important that, regardless of the situation, fresh air supply be maximized during influenza outbreaks. Otherwise, airborne pathogens may continue to re-circulate and build up in concentration. While it is true that from a risk assessment point of view, the infection risk is dependent on the survivability of the microorganism, the infectious dose, host susceptibility, etc., emerging diseases with novel infectious agents demand prudent management.

Depending on the type of ventilation, increasing fresh air can be achieved in different manners. Most modern “sealed” buildings are equipped with central air conditioning systems. Fresh air is drawn from the outside through fresh air intakes, and then either cooled centrally by air handling units (AHUs), or locally by fan coil units (FCUs) at individual offices. The air conditioning control buttons, accessible to occupants for adjustment of the temperature and fan speed, cannot regulate the amount of fresh air. In other words, you might feel the breeze and the cool air and be very comfortable, but these are not indicators for sufficient fresh air. Building occupants must discuss the matter with building engineers or facility managers to ensure adequate amount of fresh air is delivered into the building. While there is competing interest for building operators to reduce/minimize fresh air intake because of energy saving considerations, proper health maintenance should demand a higher priority, particularly during the flu season when adequate fresh air can help to dilute pathogen concentration by removing them with the exhaust air.
Also, providing sufficient fresh air is crucial in the reduction of radon from building concrete materials and volatile organic chemicals (VOCs) from building furnishings.

Older buildings may use window-mounted air conditioners. In these cases, it is important to keep the vent of the air conditioners at the “open” position to allow fresh air to get in. Opening some windows and installing window-mounted exhaust fans may also be needed, especially for places using split-type air conditioning units which do not allow fresh air intake at all. Air cleaners with HEPA filters may be employed to reduce airborne microbial populations in the area in case there is difficulty in increasing fresh air supply. HEPA filters, when properly installed and maintained, are proven to be effective for all sizes of particles, down to 2 nm range, which cover all microorganisms including viruses. Nevertheless HEPA filters are not effective for capturing radon or VOCs, which are gases. The most effective measure remains to be increasing fresh air by all feasible means.

Summary:

1. Microorganism-containing particles released during coughing and sneezing events are of a wide range of sizes. Some degrees of airborne hazard may exist even for infections typically considered to be spread by the droplet route, especially under conditions that favor the dispersal and suspension of microbe-containing aerosols.

2. To reduce the risk of airborne infections, it is important to increase fresh air intake, which will also help to remove other indoor air pollutants, such as radon and volatile organic compounds:
   
   (a) Central air conditioning: discuss with building management

   (b) Window-type air-conditioner: open the air vent to allow air exchange

   (c) Split-type air conditioning unit: open some windows and /or install window-mounted exhaust fans.

3. Air cleaners with HEPA filters may be employed to reduce airborne microbial populations in case there is difficulty in increasing fresh air supply. Proper maintenance is required for their effective functioning.
A fatal accident happened in an organic chemistry laboratory at the University of California, Los Angeles (UCLA) in late December, 2008. A research assistant was using a syringe to transfer about 50 mL of a pyrophoric chemical (a substance that catches fire spontaneously once exposed to air), tert-butyl lithium, dissolved in pentane, a flammable solvent. The plunger suddenly came apart from the syringe barrel, causing the pyrophoric chemical to spew onto the hands and body of the researcher and catch fire. Even though the fire was finally put out by other laboratory workers, the researcher suffered second to third-degree burns to over 43% of her body. She died in January 2009 due to the burns and the resulting complications, after 18 days in the hospital.

Accident investigations were conducted by the university and the government. A fine of more than US$31,000 was imposed by the State of California to the university in early May, 2009 for civil violation of multiple safety regulations. Criminal investigation is still ongoing. The findings so far highlighted a number of deficiencies in the chemical safety management and practices in the laboratory in question. These can serve as sobering reminders for all laboratory chemical users everywhere:

1. **Adequacy of risk assessment.** The appropriateness of using a syringe to transfer pyrophoric liquid in the experimental procedure was questionable. There was no record of any risk assessment conducted of this critical operation involving a highly hazardous chemical.

2. **Adequacy and record of safety training.** The deceased research assistant was a fresh graduate, and had joined the research group for only three months. It was unclear how much training was given to her, or whether it included any specific and hands-on training related to handling pyrophoric chemicals and emergency response procedures. The fact that the victim ran in the direction away from the nearest emergency shower after the accident might indicate there was inadequate safety training. A family member of the deceased person alleged that no safety training was ever provided. In any case, there was no safety training record available.

3. **Proper use of fume hood and other safety devices.** The victim was conducting the chemical transfer inside a fume hood, however, the sash of the fume hood was apparently raised too high to prevent the chemical from spewing onto the body of the victim. If the sash was at a lower position, or if a blast shield or a similar barrier had been placed between the body and the chemical, it might have restricted the injury to the hands and forearms.

4. **Lack of protective clothing.** The victim was wearing a pair of rubber gloves, which were not flame-proof, and she was not wearing a laboratory coat when the accident occurred. It also happened that she was wearing a sweater that was made of highly flammable synthetic material at the time. These factors combined to create a highly unfavorable situation when the pyrophoric material caught fire.
5. Inadequate supervision and unsatisfactory safety management. The laboratory in question was inspected two months before the accident and was found to be lacking in various aspects of chemical safety, such as improper storage of hazardous chemicals, missing first aid kits and chemical spill kits, personnel not wearing personal protective equipment such as eye protection, laboratory coats and gloves. The situation was not corrected after the due date for corrective actions. These all pointed to lack of supervision from the professor in charge of the research laboratory.

Links to Los Angeles Times articles:

http://www.latimes.com/features/health/la-me-uclalab5-2009may05,0,6665233.story

http://articles.latimes.com/2009/mar/01/local/me-uclaburn1

In HKUST, at the beginning of each safety training class offered by HSEO, participants are reminded that the training class only covers chemical safety principles, while each supervisor has the responsibility to provide specific safety instructions and hands-on safety training to staff and students working under him or her. Moreover, science and engineering departments that use hazardous materials and potentially dangerous operations in their laboratories also have a departmental safety clearance procedure, which individually assesses and documents the needs of specific safety training, personal protective equipment of each new laboratory worker. The safety clearance form also documents the completion of safety induction in the laboratory environment, including showing the new worker where key safety features, such as fire alarm, emergency eye wash and shower, are located. These are important tools for us to systematically ensure proper hands-on safety training is given to new laboratory workers, and to document such effort for inspection by university management and relevant government authorities.

We would like to take this opportunity to remind all HKUST laboratory supervisors and workers, and in particular, faculty members who are principal investigators of research projects, that risk assessment and hands-on safety training are crucial to chemical safety in laboratories. Besides, these crucial elements can only be accomplished by the initiative of laboratory supervisors and faculty members. This is a good time for departmental management and faculty members to review how well these procedures are being implemented in their departments and laboratories, and whether proper records are available to document these efforts.

We must rely on the continuous efforts of laboratory supervisors and workers, the management oversight of department heads, and the support of relevant campus units including HSEO, to achieve and sustain a safe research environment.
Colorectal and stomach cancers rank amongst the top five cancer killers in Hong Kong. Some doctors expect that colorectal cancer will even surpass lung cancer in the next five years to become the most common cancer affecting our community. These diseases may not be noticed in its early stage as patients may not experience symptoms. However, early detection of cancer is associated with a significantly increased survival. The case numbers for both cancer types have been increasing rapidly in the past few years. Detection and identification at the early stage can certainly help reduce the incidence of these cancers.

**Signs and Symptoms**

**Stomach cancer:**
- Indigestion or stomach discomfort
- Nausea and vomiting
- Recurrent epigastric pain
- Resemble peptic ulcers
- Upper gastrointestinal bleeding (tarry stools)
- Iron deficiency anaemia

**Colorectal cancer:**
- Passage of fresh blood or mucus
- Change of bowel habit (diarrhoea, constipation, etc.)
- Decrease in caliber of stool
- Tenesmus (frequent urge of defaecation)
- Abdominal distension and repeated vomiting
Screening for stomach and colorectal cancers

One of the effective and easy tests to diagnose the above cancers is through the use of an endoscopy system which is commonly used by the surgeons nowadays to examine the inside of your stomach and bowel. The entire procedure only requires about 15 – 30 minutes. Without the need for staying in the hospital, patients undergoing the endoscopy service can usually return home after 1 to 2 hours’ rest.

Gastroscopy

- Gastroscopy is also called OGD which stands for oesophago-gastro-duodenoscopy.

- This test enables the physician to look inside the oesophagus, stomach and duodenum, and is used to discover the reason for swallowing difficulties, nausea, vomiting, reflux, bleeding, indigestion, abdominal pain or chest pain.

- A local anesthetic will be sprayed onto your throat to minimize the discomfort (choking feeling) when the tube is being introduced.

- You will be asked to swallow at the time the tube is placed into your throat. This will guide the endoscope into your oesophagus. The doctor will gently push the tube so that its end moves into your gullet.

- If a suspicious area is seen on the lining of the stomach or esophagus, the doctor will remove a tiny piece of tissue (a biopsy) for examination under the microscope.

- The procedure takes only 10-15 minutes.

Colonoscopy

- This is a procedure by using a flexible endoscopy system to look at the inside of your colon.

- Colonoscopy helps identify the cause of gastrointestinal bleeding, chronic diarrhoea, colon obstruction and anaemia.

- This test facilitates the diagnosis of disease in the colon like ulceration, inflammation, polyps, haemorrhoids and tumours, etc.

- You will first be given a laxative solution to drink prior to the colonoscopy session. The solution will clear most of the fecal matter from your bowel. You will be requested to keep fast for 4-6 hours before examination. You will be given medication of sedative agent and analgesic before the procedure to make you relax and relieve the discomfort.

- The procedure takes approximately 30 minutes.
Conclusion

Stomach and colorectal cancers are increasing health care burdens in Hong Kong and worldwide. There are evidence-based screening recommendation guidelines by various professional organizations on this issue. Organized screening programs could significantly reduce mortality associated with these two cancers. In addition, cancers diagnosed at an earlier stage are associated with a better prognosis than those diagnosed at a more advanced stage.

We hope this article helps you understand more about these cancers and the related endoscopic procedures. If you have further questions, you may consult your primary care doctor or you may contact the campus clinic.

(This article is written by Health Concepts Ltd, the HKUST’s medical clinic operator.)
HSEO began offering on-line safety training courses more than 10 years ago, and since then it has become an important part of our training effort. It offers the flexibility for staff and students who work with hazardous materials or operations to obtain basic safety training at their selected time and at their own pace. The on-line training includes an in-person session by appointment for questions and answers, and to complete an assessment paper.

While the on-line training courses proved to be a useful way to supplement traditional classroom sessions, it has been difficult to keep the two formats of training completely in sync with each other. The reason is the amount of preparation and production required for updating on-line training courses. The script writing, narration recording coupling with presentation slides all take considerable time. Therefore the on-line training courses are updated less frequently than the classroom sessions, which is a situation we always want to improve on.

Recently, HSEO tried out a computer software that allows synchronized playing of presentation slides together with a video recording of the lecture. This will allow us to keep the on-line courses frequently updated. In fact they will be recordings of recent classroom sessions, so the contents of both formats will be essentially identical. We have now prepared three on-line training courses in this new format, and have launched them to replace the old versions.

Please take a look of these new on-line safety training courses, and let us know what you think by sending your comments to safety@ust.hk!

Chemical Safety 1:
http://www.ab.ust.hk/hseo/training/chem/chem01/

Chemical Safety 2:
http://www.ab.ust.hk/hseo/training/chem/chem02/

Biological Safety:
http://www.ab.ust.hk/hseo/training/bio/realmedia/
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**Notice:** If you have completed one of the Self-Learning programs, you may click the button below to send a request to HSEO to arrange for an assessment.

[Please Click here to SEND REQUEST]