



Occupational  
Hygiene Association  
of Ontario  
**FORUM**



## President's Message

The “New Normal” for Hygienists and OHAO?

As most of us are getting used to the new reality of work (and life outside of work) during the pandemic, we have time to contemplate the “new normal” way of looking at occupational hygiene activities, broadly. At the beginning of the pandemic, a Human Resources Manager told me that OH&S personnel were not “essential” and were therefore not allowed onto a critical worksite that was still operating. This view was soon confirmed by many other hygienists that I was in contact with, who were all working at home, and not able (or allowed) to go on-site. We can do “face to face” virtual meetings and phone discussions, but the hands-on assessments that hygienists conduct in the workplace, and visual cues we use to make professional and personal judgements was forced to change rapidly. Also changing, is how we learn and adapt to new challenges, like preparing workplaces to avoid virus transmission as more and more businesses re-open. Many of us now rely solely on e-resources to keep up daily with news or studies that inform our practice. Your board of directors, all of who are living through these changes in our “day” jobs, are trying to adapt OHAO activities to respond to the needs of our members now, and in the near future.

Less than a year ago, OHAO’s experiment with one online recorded webinar was the cumulation of nearly a year of planning, and

yet our first two live (free) webinars during COVID-19 were planned and executed in about a week. This is largely the result of necessity, and the good luck to have the right web-based app to create virtual impromptu meetings. We learned from these experiences and continue to get your feedback on how to proceed with such activities, at least while the public health emergency is still underway. We have begun issuing more frequent email blasts, with links to important new sources of guidance and news that affects our profession. And the board is always trying to find ways to interject our collective voice into the ears of decision makers who are intently listening to the medical community about how to deal with COVID-19. Members with suggestions, news or ideas to share to the hygiene community are always encouraged to email the board via [office@ohao.org](mailto:office@ohao.org). We can all learn more from each other’s collective experiences.

As the sad news crossed my inbox that the World Congress on OH&S planned for Toronto this October has decided to postpone until September 2021, we are reminded that OHAO activities like the fall symposium and PDC may need to be transformed into a virtual experience. As always, we will do our best to keep the public protected and yet learn to adapt to a new normal for continuing education and promotion of the profession.

*Paul Bozek, ROH, CIH*

### Highlights in this Issue of OH Forum

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## Editor's Message

Greeting OHAO-verse. It is no exaggeration to say that we have collectively had a challenging time these past several months performing our roles. The COVID-19 era that we are currently experiencing has brought new challenges and a different way of thinking, especially with regard to risk management and hazard control. I find it interesting to look at COVID-19 controls through a hygienist's eyes. The hazard, in this case, is not only a workplace hazard, but an environmental one that can be found in many places. From our experience to date, here's a crude breakdown of what I think COVID-19 controls have looked like:

Engineering Controls	<ul style="list-style-type: none"> <li>• Physical Barriers (e.g. plexiglass barriers at various stores)</li> <li>• Physical distancing</li> </ul>
Administrative Controls	<ul style="list-style-type: none"> <li>• Staying home</li> <li>• Working from home</li> <li>• Closing public areas and "non-essential" businesses</li> <li>• Cancelling events (e.g. sports, entertainment)</li> <li>• Virtual health care</li> </ul>
Personal Protective Equipment	<ul style="list-style-type: none"> <li>• Respiratory protection (with viral protection, e.g. N-95, air purifying respirators)</li> <li>• Respiratory protection (no viral protection, e.g. surgical masks, homemade masks)</li> <li>• Gloves</li> <li>• Goggles/<u>faceshields</u></li> </ul>

In these times, it is very difficult to discuss COVID-19 without editorializing. Everyone has an opinion about how it is being managed and what should be done differently. It is not an easy subject to navigate through and it has been encouraging to connect with other hygienists (through our Zoom meetings) to discuss how we are dealing with COVID-19 in our respective workplaces. It may sound like a cliché to say that we will get through this together, but we will. I wish you all good health, patience and perseverance during these trying time. Safe and well,

*Negin Ghanavatian, MHS.*

**Email articles to: [neginghanavatian@gmail.com](mailto:neginghanavatian@gmail.com)**

## OHAO Updates

### Save the Dates Fall 2020:

The OHAO 2020 Fall PDC will take place on Wednesday, October 21, 2020 and the 2020 Fall Symposium will take place on Thursday, October 22, 2020.

At this point in time it is likely that the events will take place virtually and we will have more information for you soon.

# OH FORUM

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## Mission Statement

To advance the profession of occupational hygiene and to serve the interests of our members by:

- sponsoring professional development and training;
- promoting public and legal recognition;
- developing partnerships with stakeholders;
- providing public education;
- fostering communication and networking.

rev. May 2010

## Noisy News: Hair Cell Regeneration – A Cure For Hearing Loss?

Alberto Behar

Scientists have known for quite a long time that the cause for sensorineural hearing loss is the destruction of the stereocilia of the hair cells in the cochlea. Naturally, this leads up to wonder, if they are destroyed, is there any way of re-growing them? In this article, we will analyze the phenomenon and the present state of knowledge about a solution.

We are used to experiencing the regeneration of some human tissues. For example, as a result of a fall, we may bloody our knee. No serious consequences arise. The bleeding stops, most of the time, by itself and we forget all about the incident. Basically, our skin and other affected tissues start the healing process right away and after some time, we are as sound as we were before. Given, sometimes there are scar tissues that betray the fact that something has happened, but it has finished. The problem has been solved.

Closer to home, when we get a needle or receive a transfusion, a “hole” is intentionally driven through our skin and other subjacent tissues. As before, after some time, the “hole” disappears and no sign remains that there was some damage done.

What we are talking about is the regeneration of tissues that have been affected on a major or minor scale. We never stop to think how this is done. We just assume that Mother Nature has taken care of the damage.

There are many kinds of tissues in our organism: skin is just one of them. It regenerates very easily. However, the nervous tissues (and the hair cells – see Fig 1) do not at all.

Let’s recall the mechanism of hearing. Sound, the atmospheric disturbance, is transmitted to the external ear through the air. It reaches the external ear and puts in motion the eardrum. This, in turn, transmits the vibration through the three ossicles of the middle ear to the inner ear. The vibrations reach finally the inner ear that sets in motion the endolymph, the liquid that fills the cochlea. The top part of the hair cells, the stereocilia are then set in motion, generating electrical signals. Those signals are

then sent to the brain through the acoustical nerve and interpreted as “sound”.

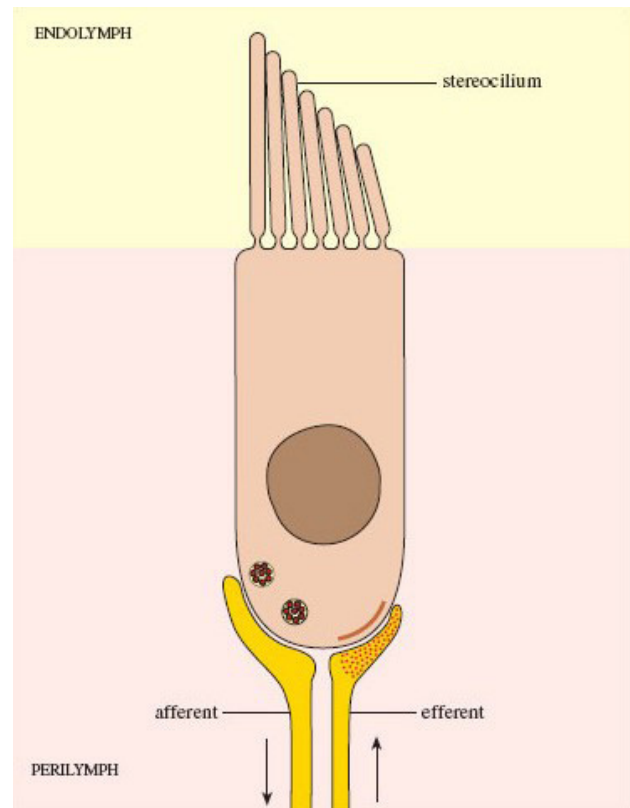


Fig 1.: Hair cell with stereocilia on the top. Noise affects mainly the stereocilia, while the cell itself can be destroyed by other causes.

Therefore, any damage to the stereocilia affects the signal generation. In doing so, the brain receives less or distorted signals, that translates in hearing loss (and many other effects).

Hair cells destruction can be the result of aging, use of some ototoxic drugs, diseases, infections and heredity. It may be also the effect of exposure to high level noise that causes mechanical destruction of the stereocilia. In all cases, hair cell regeneration could be the cure-all for hearing loss.

The question has been for a long time: can those cells regenerate? Is there a way of making them “grow” again?

Unfortunately, in mammals they do not re-grow by themselves. So, the two questions that researchers have been working on are: Are there species whose hair cells do regenerate spontaneously? And If there are, what is the mechanism?

The answer to the first question is “yes”; there are two species: birds and fish. It has been demonstrated that birds spontaneously regenerate their hair cells, destroyed by high noise level exposure or from ototoxic chemicals. Not only they regrow, but the new cells keep their physiological function of generating nerve impulses and in so doing, restore the hearing abilities of the birds.

The ears of non-mammalian vertebrates are capable of regenerating sensory hair cells after acoustic trauma or ototoxic injury. In contrast, the mammalian inner ear lacks regenerative ability and the loss of hair cells results in permanent deficits in hearing and balance. Comparative observations across all vertebrate classes suggest that regenerative ability was a stem trait and was lost during the course of mammalian evolution.

Recent studies in both lower vertebrates and mammals have uncovered genes and pathways important in hair cell development and have suggested ways that the sensory epithelia could be manipulated to achieve hair cell regeneration. These approaches include the use of inner ear stem cells, trans differentiation of non sensory cells, and induction of a proliferative response in the cells that can become hair cells. It is a very delicate, specialized work and no applications are expected soon.

So, for the time being, the adage “an ounce of prevention is worth a pound of cure” seems to hold true.

## Comfort From PPE

*Alberto Behar*

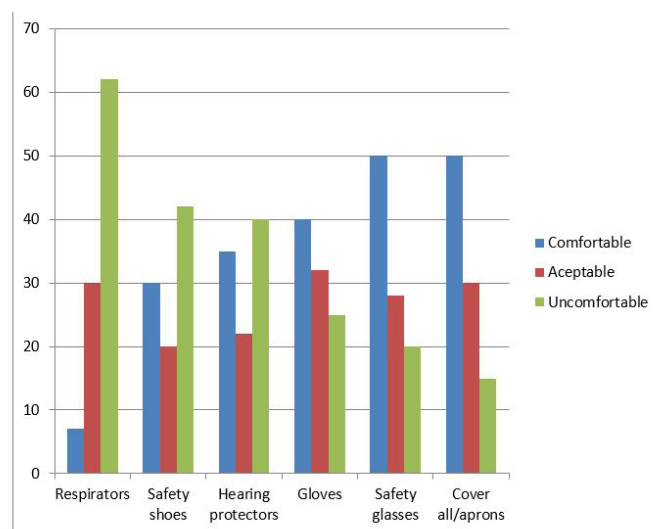
It is generally assumed that respirators are considered as being the least comfortable PPE by their users, followed by the hearing protectors. However, a study has resurfaced, that disputes this assumption.

In their paper *Comfort of personal protective equipment*, Akbar-Khanzadeh and Bisesi, claim that the second place belongs to safety shoes. This is a conclusion from a study

in a plant that encapsulates automobile glass. The authors conducted a survey on 208 out of the 475 workers in the plant, who are users of one, or a combination of, safety glasses, safety shoes, gloves, respirators, hearing protectors, and coveralls/aprons.

The following table summarizes the findings, showing the percent of workers that found the protectors ‘Comfortable’, ‘Acceptable’ and ‘Uncomfortable’.

Protectors	Comfortable	Acceptable	Uncomfortable
Respirators	8	30	62
Safety shoes	33	27	45
Hear. protectors	35	24	41
Gloves	43	32	25
Safety glasses	50	28	22
Cover all/aprons	55	30	15



It shows the hearing protectors in the fourth place as comfortable and in the third as uncomfortable, with respirators as the worst in terms of comfort.

The authors conclude that despite all the enormous steps in making PPE more appealing, light weight, or better fitting, about half of the workers surveyed did not accept their PPE as being comfortable. To make the workplace safer, management needs to improve the comfort of PPE, in addition to protective qualities, while providing workers with adequate education and personal protection programs.

1. *Comfort of personal protective equipment*: F. Akbar-khanzadeh et al., Applied Ergonomics Vol 26, No. 3, pp. 195- 198, 1995.



## MVOC Detection: Going to the Dogs?

E.A. Sullivan, PhD, CIH, ROH, CChem

Fungi and bacteria, at certain growth stages and varied nutrient conditions, produce many secondary metabolites:<sup>1</sup> microbial volatile organic compounds (MVOCs). Materials emissions and cleaning activities add to the VOC burden indoors; humans also contribute. Investigators have attempted to use MVOCs as indicators for the presence of microbial precursors. It appears, however, that traditional MVOC sampling is ‘not particularly useful as a means to establish whether microbial growth is impacting the health of building occupants and requires remediation’.<sup>1</sup>

MVOCs are likely only a minor portion of total VOCs, the low concentrations – microgram/m<sup>3</sup> – being challenging for analysis. MVOCs have diverse chemical natures: aliphatic, aromatic, alicyclic, heterocyclic, saturated or unsaturated hydrocarbons; alcohols, ketones, aldehydes, esters, ethers, terpenes and sulfides. No simple, rapid, inexpensive and reliable method is available to identify the nature and extent of indoor microbial growth from measurements of indoor VOC concentrations. More importantly, ‘no VOCs have been found that are uniquely produced by any given microbial species or strain. Therefore, the presence of a particular microorganism cannot be predicted from an indoor VOC sample’. However, ‘MVOCs and their odors are indicators of microbial growth and may reflect microorganism presence even when growth is hidden, as MVOCs penetrate to spaces where investigators can smell or measure the compounds’.<sup>1</sup> MVOC odours have been variously described as pungent (‘old cheese’), unpleasant (mouldy, musty, fetid-decaying, rotten, ‘dirty socks’) or pleasant (grassy, earthy, fruity).

Animals have a keener sense of smell than humans. Dogs can track human scent and, at airports, canines detect prohibited foodstuffs, chemicals, drugs, cash and explosives. Dogs have also been used to detect hidden mould in buildings;<sup>2-4</sup> advantages are low cost and immediate results. There is skepticism about the accuracy and consistency of detection by mould dogs<sup>4</sup> but even traditional air sampling – with potential false negatives – is not an entirely reliable screening tool for mould in buildings.

Travelers in Europe might have seen dogs at work sniffing out the culinary delicacies, truffles. The black truffle (*Tuber melanosporum*) and the white truffle (*Tuber magnatum*) are subterranean ascomycete fungi usually found in close association with the roots of oak trees.<sup>5</sup> When the ascospores are fully developed, VOCs are produced; more than 200 have been described, including aldehydes (methyl-substituted butanals), alcohols (e.g. 2-methyl-1-propanol and 1-octen-3-ol) and sulfides. Truffle metabolites attract spore-dispersing mycophagous insects, and animals such as birds, deer and rodents;<sup>6</sup> dimethyl sulfide is known to attract truffle-detecting animals.

Bacteria can produce odorous VOCs. In hospitals, the ‘superbug’ *Clostridioides* (formerly *Clostridium*) *difficile* can cause serious and sometimes deadly intestinal disease.<sup>7</sup> *C. difficile* is usually (but not always) associated with fecal material...very common in hospital settings. Apparently, dogs can be trained to detect *C. difficile* in clinical and cultivated samples; the signature attractant has not been established. *C. difficile* spores are resistant to most antibiotics; sporicidal disinfectants<sup>8</sup> usually contain hypochlorite or peroxyacetic acid/peroxide. Also, strains are becoming increasingly virulent; one particular study<sup>9</sup> indicated that 21% of admitted patients contracted the organism during their hospitalization, about one-third of these developing a symptomatic infection.

The only proven way to reduce the risk of *C. difficile* disease is implementation of an antibiotic management program in conjunction with enhanced infection control procedures. Early and rapid identification of contaminated surfaces and environmental reservoirs of *C. difficile* greatly enhance infection-prevention efforts. Of the common tests,<sup>10</sup> some have high false-negative rates, even in patients with severe clinical disease. The PCR method has an accuracy greater than 99% – appropriate for clinical diagnosis but impractical for extensive, routine surface sampling. With reportedly high diagnostic accuracy, detection dogs were used to identify patients with *C. difficile* infection during an outbreak in a Dutch hospital<sup>11</sup> and in some Vancouver hospitals<sup>12</sup> dogs are proving useful for routine environmental monitoring.

Perhaps signature MVOCs don't really need to be sought and characterized. Animal detection works well enough for truffle hunting. Canine detection of hidden mould in buildings has not been routinely used; for occupational hygienists, visual inspection, assessment and verification remain crucial to mould remediation, so detection dogs are unlikely to threaten mould consultants' livelihoods. In hospitals, canine detection of *C. difficile* 'will never reliably achieve the accuracy of currently highly sensitive molecular diagnostics'<sup>13</sup> but the procedure seems convenient for rapidly screening large areas, as part of an infection control program.

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## Health Physics



—Column Editor—

Michael Grey, CHP, ROH  
SAIC Canada

## Safety Culture

Several months ago, when I was busy, I recorded the HBO series 'Chernobyl' so I could watch it later and I've started watching it over the last few weeks when I've had time on my hands. 'Chernobyl' is a six part limited series based largely on Nobel Prize laureate Svetlana Alexievich's 1997 book 'Voices from Chernobyl: An Oral History of a Nuclear Disaster'. The English translation, by Keith Gessen, was first published in 2006.

I was working at Chernobyl in November and December of 1997, just about the time 'Voices from Chernobyl' was originally published. I was part of a team investigating the use of Geographical Information Systems (GIS) to manage the data collected by environmental monitoring systems. This was my first exposure to GIS and geostatistics, subjects that I have returned to many times since then. I had read the report of the 1986 accident prepared by the International Atomic Energy Agency (IAEA) and other bodies. The historical summaries explained what had happened, but I never really understood how it could have happened until my visit. I was sitting in the front passenger seat of one of our cars, as our team was returning to the site after sunset on a rainy evening, toward the end of our visit. The road we were following, ran along one of the cooling water canals on the site. There was no guardrail along the edge of the road, which was close enough to the canal that all I could see out of the passenger's side window was water.

The driver was travelling faster than I would have liked, the passenger's side headlight was out of alignment, so the beam pointed up into the air and the wiper blade on the driver's side wasn't clearing the water off the windshield. It was during that drive that I first felt that I could understand how the accident could have happened.

In 1991, the IAEA International Nuclear Safety Advisory Group (INSAG) introduced the concept of ‘safety culture’ in response to the Chernobyl accident. INSAG defines ‘safety culture’ as “that assembly of characteristics and attitudes in organizations and individuals which establishes that, as an overriding priority, nuclear plant safety issues receive the attention warranted by their significance”.

According to INSAG, safety culture “refers to the personal dedication and accountability of all individuals engaged in any activity which has a bearing on the safety of nuclear power plants”. Safety culture requires “an all-pervading safety thinking”, which allows “an inherently questioning attitude, the prevention of complacency, a commitment to excellence, and the fostering of both personal accountability and corporate self-regulation in safety matters”. (The quotes are taken from IAEA Safety Series No. 75-INSAG-4, Safety Culture, IAEA, Vienna, Austria, 1991).

The concept of safety culture was quickly adopted in much of the nuclear industry, but local cultural norms have presented barriers to its adoption in some countries, particularly those where a questioning attitude can be seen as showing a lack of respect to seniority. More recently, the concept of ‘safety culture’ has begun to spread beyond the nuclear industry and it has now been incorporated into most occupational safety standards.

I have a second strong memory from that 1997 trip to Chernobyl. On our last day, as we were driving through the exclusion zone on our way back to Kyiv, I saw an elderly couple working in a small garden outside what I would have described as a ‘dilapidated shack’. Entrance to the Exclusion Zone was restricted to authorized personnel, so I asked our escort about them and he told me that they were among a small number of people who had moved back into the Exclusion Zone. They had lived most of their lives there and they didn’t want to live anywhere else. I’m sure they died long ago, but I can’t think about Chernobyl without remembering them. I’ve never read ‘Voices from Chernobyl’ but I recently downloaded a copy onto my e-reader. I may try reading it after I finish watching the HBO series, but I attended a session on the psychosocial impacts of the Fukushima accident several years ago and I remember the stories told by those impacted by that accident. I am expecting ‘Voices from Chernobyl’ to be difficult reading.

## Your Board At Work

### OHAO COVID-19 Statement:

OHAO is concerned about the spread of the COVID 19 virus. We encourage Ontario employers to monitor and implement the controls outlined by public health authorities to reduce the spread of this virus in Ontario workplaces.

For hygienists providing guidance to their employers or clients, we recommend relying on credible sources of information to make professional judgments such as those posted on the Infection and Prevention Control Canada (IPAC Canada) website <https://ipac-canada.org/>.

OHAO has also provided several email updates during the past several months, click on the links below to view the emails (you will need to log in to your OHAO account):

[March 23 Update](#)

[April 7 Update](#)

[April 20 Update](#)

OHAO also presented COVID-19 and Occupational Hygiene on May 28, 2020 presented by Dr. John Murphy, REA

[Click here to view the presentation.](#)

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