

How clean are your hands? Raising children's awareness of microbes

If pharmacists were to go into primary schools to teach children how to wash their hands properly, they could help reduce infections while raising their own community engagement

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A MAJOR issue in all aspects of healthcare today is the growing problem of bacterial resistance to antibiotics. This makes treatment of infection not only harder, but also more costly. Up to 25,000 people a year die through antibiotic-resistant infections. In recognition of this, the World Health Organisation's health awareness day on the 7 April 2011 focused on the global spread of antimicrobial resistance and ways by which this might be combated.

A significant number of microbial infections arise from dirty hands, either through ingestion (direct or indirect, eg, through food handling) of contaminating bacterial species or by direct contact with open wounds and mucosal surfaces of the body. On the basis that prevention is better than cure, we developed a workshop for year 6 primary school pupils to demonstrate to them the importance of effective hand washing, while promoting the role of the pharmacist.

Before visiting the primary school a questionnaire was distributed to the pupils in order to gauge their level of knowledge about micro-organisms and their preferred learning styles. As a result of the feedback, an additional aim of the workshop was to deliver some hands-on microbiology to support the Key Stage 2 curriculum.

The first visit to the class was timed for when the pupils came in from the playground after their morning break. The pupils were provided with a nutrient agar plate and were asked to press three or four fingertips gently on to the agar. Volunteers were then selected to wash their hands and repeat the exercise. The plates were labelled, sealed and taken back to the microbiology laboratories in the school of pharmacy and incubated for a week.

When we returned one week later, we gave a brief and introductory Powerpoint presentation to the class on what micro-organisms are, where they are found and what some of the beneficial and harmful effects they can cause are. The presentation was kept simple and brief with lots of imagery to hold the pupils' attention.

Surprised

After we answered some questions from the enthusiastic pupils, we returned the agar plates for them to examine. Most were surprised by the volume and diversity of colony-forming units present on the agar. In most cases the hand washing exercise worked well, showing a general reduction but not elimination of microbial flora. Results from the hand

washing exercise were used to explain to the pupils the difference between resident, beneficial bacteria and transient, possibly harmful micro-organisms. In addition to viewing the agar plates, the pupils were given the opportunity to look down microscopes at a range of different micro-organisms, including *Staphylococcus aureus*, *Bacillus cereus* and *Saccharomyces cerevisiae*.

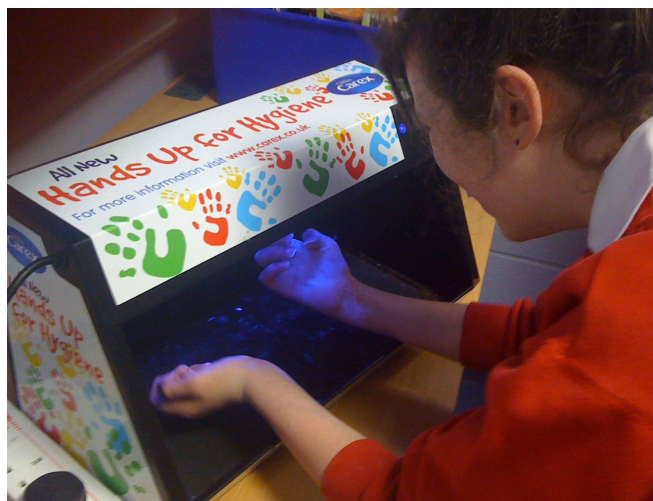
To accompany the exercises the pupils were given worksheets to make observational drawings of the colonies that they saw on both the agar and under the microscope, noting their shapes and colours.

To further demonstrate the importance of hand washing, an ultraviolet glow-gel was used to model microbial transmission and contamination. The glow-gel comes in three formulations (gel, powder, spray) and is invisible to the naked eye but fluoresces under a UV light.

The first exercise involved using the glow-gel spray to mimic the effect of sneezing. A small amount of the gel was sprayed on to the palm of a volunteer pupil who then shook hands with the pupil sitting on the right. That pupil then shook hands with another until a round of handshakes had occurred among the group of 10 pupils. A small hand-held UV torch was then used to visualise ultraviolet particles ("bugs") on the pupils' hands. They were surprised to see that, in most cases, the particles were transmitted to at least the fifth individual in the chain.

Having established how easily micro-organisms can be acquired and spread, we then used the glow-gel to demonstrate correct hand-washing technique. Small amounts of the gel were applied to every pupil's hands and visualised in a UV glove box.

The pupils then washed their hands in their usual manner but afterwards fluorescent nails, wrists and occasionally areas of the palms were prominent under the UV lamp. The correct method of hand-washing was then demonstrated, accompanied by a hand



Glow-gel and a UV lightbox were used to good effect

washing "rap". In most cases a significant improvement in cleanliness was observed. Some of the pupils were so enthralled by this activity that they repeatedly washed their hands to remove all traces of fluorescent particles.

To conclude the lesson the pupils were asked to design a poster, along the lines of the "catch-it, bin-it, kill-it" slogan to illustrate the importance of effective hand washing. A prize was awarded for the best poster.

Success

The lesson was judged an overwhelming success, with pupils and teachers thoroughly enjoying the activities. As well as raising awareness about the importance of hand washing and the spread of microbial infections, the activities also introduced the pupils to elements of microbiology and pharmacy. Although a UV glove box was used to great effect in the demonstration, a small UV torch can be used equally effectively. There is no reason why pharmacists cannot run similar awareness programmes in the community (eg, in schools, hospital wards, day centres etc). Not only might this help reduce infections caused by unclean hands, it will also raise a pharmacist's social responsibility profile and improve community engagement.

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