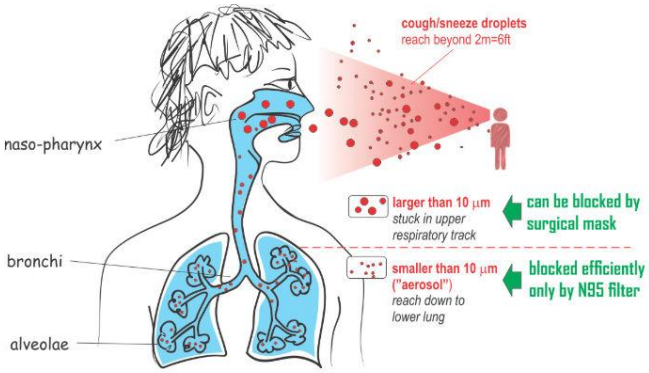
About masks and what about them, differences, overlaps and the best use - Noel Abela

Introduction

During the CIVID19 outbreak, it became so clear, that in the absence of vaccination and a general resistance to the virus, there was an absolute need Personal Protection Equipment, know with the abbreviation of PPE. This was with a greatest variety and at first and above all: masks. Short after the awareness that it was effective to use mouth caps, there was a run on masks but not available. Who could imagine that there would be such a great need of masks and facial protection. IN the first month with a dramatic shortage of equipment, we see most of the time



1) The wrong of masks for the purpose, with an impressive of creative solution
2) The wrong use of the right materials.

In this chapter the basic essentials are touched what at the end requires knowledge and competence for all this working with PPE's and above all nurses, who also need to communicate professional and with competencies on this.

The N95 or FFP2 masks are used when caring for patients that are suffering from airborne infections or during aresol generating procedures. When a patient is suffering from an airborne infection, he/she is generating very fine aeresols that remain suspended in the air for long periods of time. These masks offer a higher filtration than the surgical masks and also they offer a thight fit to the face so that the healthcare worker is not exposed to these very fine aeresols that are generated by the patients during coughing for example or during aeresol generating procedures e.g. extubation, open suctioning. In the diagram below one can see the difference between the surgical mask and the N95 mask.

About standards and classification.

In Masks there are 2 standards, the N95, N99 and N100 and the FFP1, FFP2 and FFP3. Although there are 2classification, the explanation is almost similar but not the same. This needs as short introduction because some nations. Regions and hospitals provide the N types classes while other the FFP types classes.

The use of <u>FFP's classes Masks</u> in healthcare

There is this 'EN 149' what is the a European standard of testing and marking requirements for filtering half masks. Such masks cover the nose, mouth and chin and may have inhalation and/or exhalation valves. The EN 149 defines three classes of such particle half masks, called FFP1, FFP2 and FFP3. FFP stands for Filtering Face Piece and is according to their filtering efficiency. There is also an addition classification with

- "single shift use only" (not re-usable, marked NR)
- "re-usable (more than one shift)" (marked R),
- an additional marking letter D indicates that a mask has passed an optional clogging test using dolomite dust. Such mechanical filter respirators protect against the inhalation of particulates such as dust particles, droplets, and aerosols.

Class[1]	Filter penetration limit (at 95 L/min air flow)	Inward leakage	Typical elastic band
FFP1	Filters at least 80% of airborne particles	<22%	Yellow
FFP2	Filters at least 94% of airborne particles	<8%	Blue or White
FFP3	Filters at least 99% of airborne particles	<2%	Red

The use of N95 classes Masks in healthcare

The '95' in the N95 means the filter efficiency of the mask. One can find 3 types of mask with different filter efficiency. The N means not resistant to oil and also there is R which is somewhat resistant to oil and P which means strongly resistant to oil. There are 3 levels of masks refer to filter's oil resistance

Class	Filter penetration limit (at 95 L/min air flow)	Colour
N95	Filters at least 95% of airborne particles	?
N99	Filters at least 99% of airborne particles	?
N100	Filters at least 99,97 % of airborne particles	?

The use of Surgical Masks in healthcare

These are mask with the lowest level of protection, but efficient enough for general use and effetive when moveing around in public spaces and general contacts. They are lose fitting, not severe tested, not realy reliable for inhaling small particles and cheap and they are not resuable.

- Surgical masks are meant for protecting the healthcare worker from large droplets generated from patients suffering from droplet infection such as Influenza, Covid-19 and Meningitis. However, surgical masks do not protect the healthcare worker when a patient is suffering from an airborne infection that produces fine aerosols that remain airborne for long periods. Furthermore, one has to keep in mind that surgical masks do not offer a tight fit hence air leakage can occur when in use. Surgical masks must be approved for the use as a medical device.
- Surgical masks are single use that means cannot be used more than once and after approximately 4 hours, they should be changed and discarded safely. If they become soiled and breathing becomes difficult they should be replaced with a new one. (Han et al., 2020)

[1] https://www.esst-inrs.fr/3rb/ressources/ed105.pdf

- Surgical masks can reduce the emission of large droplets into the environment above 50% depending on the type of surgical mask especially the fit, design and the number of layers. In a controlled study measuring viral emissions detected no droplets or aerosols in participants suffering from seasonal coronaviruses and there was a significant reduction in Influenza transmission when wearing surgical masks (Leung et al., 2020)

The use of Cloth masks in healthcare and in the community

The use of cloth masks in healthcare is not recommended, as it does not offer the same filtration, fit and performance during use like the medical surgical mask. These masks can be used in the community however they need to washed with soap and water on a daily basis. The performance of cloth masks can be improved by the type of material, number of layers and design. (Abrar A et al 2020). A randomised control trial by C Raina MacIntyre et al 2015 stated that the use of cloth masks in healthcare workers is not recommended as they retain moisture, hence effecting the level of filtration, which could expose the healthcare workers.

Education and choices on PPE's

It deserved a recommendation for any health professional to take time to learn about the differences and take a good look. It's also recommended to invite an expert of you local hospital to expalin about the differences and overlaps. In addition, it's also recommended to discuss the availibilty of the PPE's and agree wher and what kind of protection to use. And last, how to act on cleaning, taking care of it and disposing. In the beginning, surgical masked lwas understaddo, they where from paper, but it's not. They are of syntetic material and there for to dispose in a responsible way.

- See more about the differences 'Respiratory Protection Against Airborne Infectious Agents for Health Care Workers'
- How to wear a surgical mask a video clip from WHO: https://www.youtube.com/watch?v=adB8RW4I3o4
- How to wear a N-95 mask: https://www.youtube.com/watch?v=8E7KKO08FyA

References

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2. Leung, N. H. L. et al. (2020) 'Respiratory virus shedding in exhaled breath and efficacy of face masks', Nature Medicine 2020. Springer US, pp. 1–5. doi: 10.1038/s41591-020-0843-2
3. MacIntyre CR, Seale H, Dung TC, Hien NT, Nga PT, Chughtai AA, et al. A cluster randomised trial of cloth masks compared with medical masks in healthcare workers. BMJ Open. 2015;5:e006577.
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Further rreading : https://www.ccohs.ca/oshanswers/prevention/respiratory_protection.html

Noel Abela, Malta