



COVID-19 and great apes

Advisory for extractive industry personnel, applicable to energy, extractives, transport infrastructure, agro-industry and other projects operating in great ape habitats

Section on Great Apes & ARRC Task Force

IUCN SSC Primate Specialist Group

Effective: until further notice

Because of the physiological, anatomical and genetic similarities between humans and non-human apes, great apes (chimpanzees, bonobos, gorillas and orangutans) are susceptible to disease transfer from humans (and vice versa). Disease has been one of the greatest threats to great apes in the last 25 years. The Ebola virus for example, resulted in the deaths of an estimated one-third of the world's gorillas and chimpanzees. Other diseases, including polio-like viruses, monkey pox, anthrax, tuberculosis and respiratory illnesses have been transmitted from people to great apes and have also caused deaths in great apes. Although COVID-19 has not yet been observed in great apes, there is abundant scientific evidence that great apes are susceptible to infection with SARS-CoV-2, the virus responsible for the COVID-19 pandemic. Moreover, it is well known that great apes are susceptible to many other human respiratory viruses that cause only mild disease in people but can kill great apes. For this reason, any human activity within great ape habitat can put great apes at risk. We therefore strongly recommend that all such activities be conducted in a way that minimizes disease transmission risks from humans to apes.

Numerous projects and facilities in various sectors (including energy, extractives, transport infrastructure, agro-industry, and associated infrastructure) are planned or operating in great ape habitat across Africa and Asia (<https://www.stateoftheapes.com/>). We are reaching out to companies associated with such projects and operations to provide advice on minimizing the risks of spreading COVID-19 and other infectious diseases to great apes.

It is strongly recommended that all operations in great ape habitats are suspended. Most great ape range states currently have strict stay-at-home measures in place. Due to the risks of spreading COVID-19, it is ill-advised for all but essential travel and work to continue, and this is even more important for activities in great ape habitats. The most effective measure to prevent the introduction of this highly infectious disease to great ape populations is to avoid any interaction between humans and great apes, even indirect interactions (e.g. simply entering ape habitats or interacting with local people who themselves enter ape habitat in

search of natural resources). If work is essential, numbers of people and time spent in the forest should be reduced to a minimum.

It is crucial that everyone is aware that anyone can transmit the virus to other people or great apes before they even show signs of disease (incubation period, healthy carriers) and that the COVID-19 virus can remain active on some surfaces for several days. Saliva, sweat, nasal secretions, sputum, urine, faeces and objects that have been contaminated with these bodily fluids are important vectors of virus transmission. If they end up in the environment, great apes can become infected by walking on or touching them.

In general, exploration, construction and operations in ape habitat should adhere to guidance detailed in the IUCN Best Practices for great ape conservation (http://www.primate-sg.org/best_practices/). Here we highlight measures specific to preventing the transmission of COVID-19 while working in great ape habitat.

IF ESSENTIAL STAFF MUST ENTER APE HABITAT, THE FOLLOWING RULES SHOULD BE STRICTLY ENFORCED:

Impose a 14-day quarantine for all staff upon arrival at project site prior to entering great ape habitat.

Every day before work, all personnel should be checked for symptoms, including fever by measuring body temperature, and reminded of applicable guidance to reduce risks of disease transmission to their fellow workers, local people and great apes (see below).

No person who is clinically ill, feels unwell, or who has been in contact with anybody ill in the preceding 14 days is allowed in great ape habitat.

Require that a face covering is worn by anyone working in great ape habitat. Masks must be worn correctly and properly disposed of – never discarded (please see appendices).

If surgical masks are not available, a cloth covering the mouth and nose is advised. Please see: <https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/diy-cloth-face-coverings.html>

Install hand-washing facilities at sites and supply hand sanitizer – a disinfectant spray (such as chlorhexidine), gel or wipes – to all individuals entering great ape habitat.

Ensure that all individuals entering habitat of great apes are wearing clean clothing and disinfected footwear.

Reinforce instructions that people who need to sneeze or cough should cover their mouths and noses with the crook of their elbows rather than their hands; if they need to sneeze or cough they should immediately leave the area.

Forbid spitting and nose blowing/clearing on the ground.

Prohibit smoking in ape habitat due to the risk of disease transmission via contaminated cigarette butts.

Do not discard any waste in the environment, but carry it out and dispose in specific bins provided.

Avoid apes entirely – if seen, heard or smelled, do not approach.

If a great ape (or other wild animal) is found dead, even if it is at an advanced stage of decomposition, workers must follow these instructions:

- Never touch or handle the carcass
- Keep a minimum distance of 2 metres
- Immediately alert competent authorities

Companies are advised to enforce sanitation measures in camps and implement protocols for waste disposal, including food.

Watertight portable toilets or other appropriate facilities should be available on site for the use of all staff. No one should go to the toilet in the bush.

Site managers should ensure that employees are well-informed about emerging infectious diseases, ideally by implementing education and health programmes for staff who operate in great ape habitat.

No new residential infrastructure/camps should be established in or adjacent to ape habitat.

For more information about primates and COVID-19, please see:

- Non Human Primate COVID-19 Information Hub <https://umnadvet.instructure.com/courses/324>
- Leendertz Lab website <https://www.leendertz-lab.org/blog/the-leendertz-lab-in-times-of-sars-cov-2>

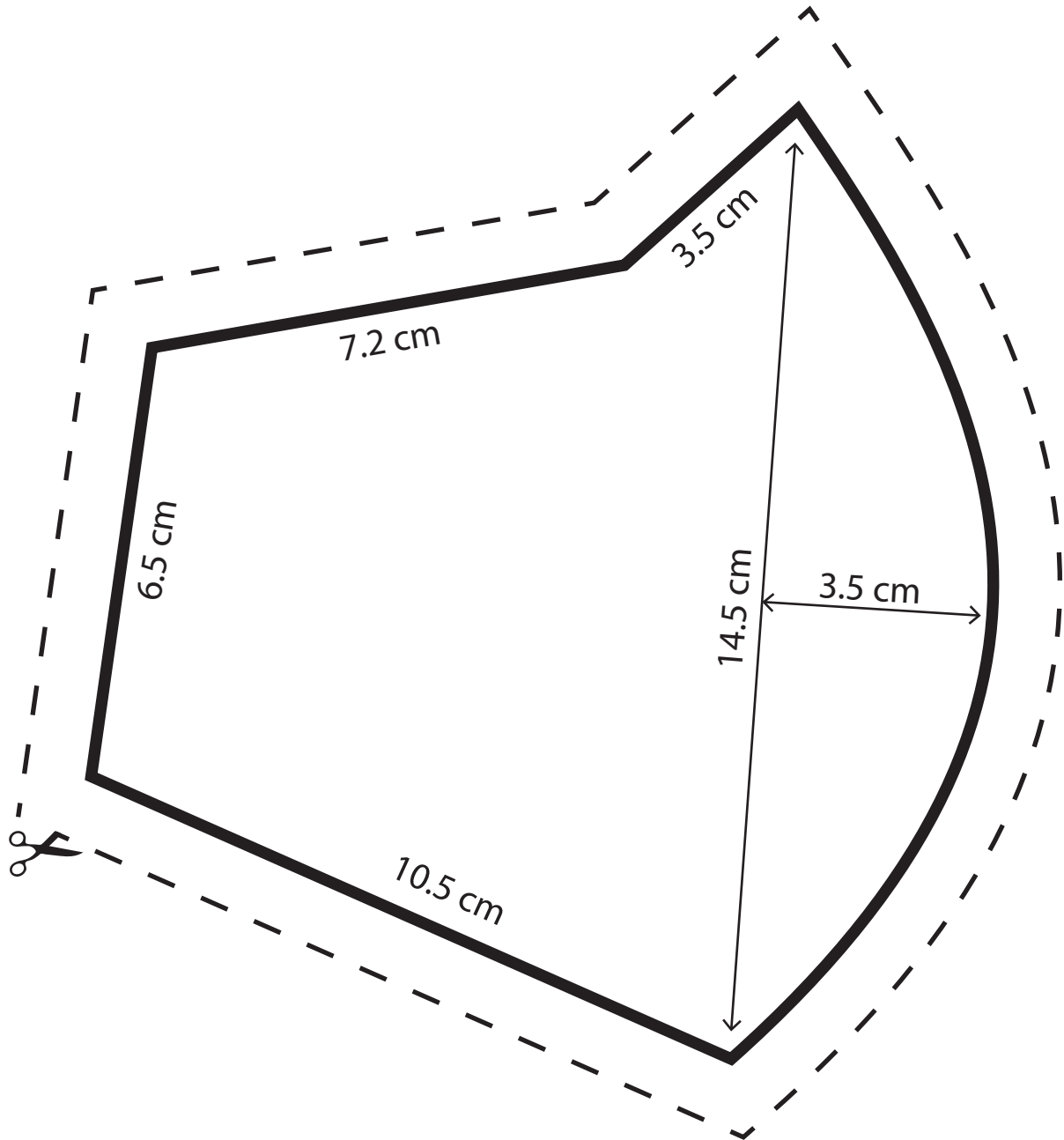
For the full recommendations on disease prevention measures relating to great apes and their habitats – published in English, French and Bahasa Indonesia – please see:

- IUCN Best Practice Guidelines for Health Monitoring and Disease Control in Great Ape Populations <https://portals.iucn.org/library/node/45793>
- IUCN Best Practice Guidelines for Tourism with Great Apes <https://portals.iucn.org/library/node/9636>

For information about the ARRC (Avoidance, Reduction, Restoration and Compensation of negative impacts on apes from energy, extractive and associated infrastructure projects) Task Force, please contact Dirck Byler (dbyler@globalwildlife.org) or see: arrctaskforce.org

Appendices

Mask pattern



Sizes are scale 1:1
based on an A4 size paper

Mask making protocol (1)



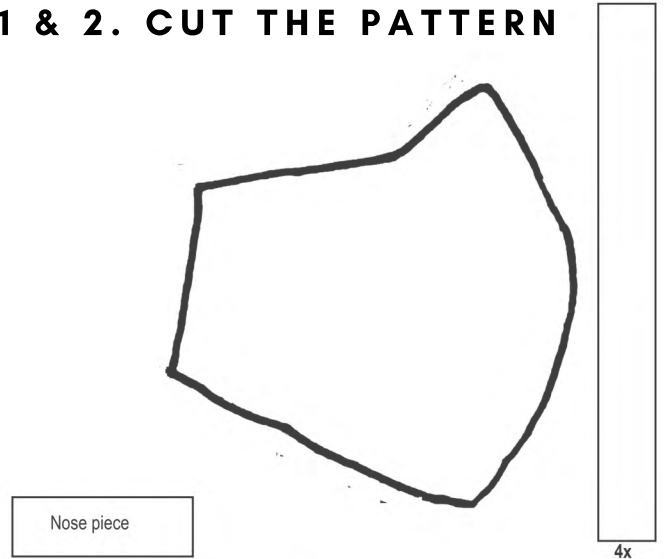
The Leendertz Lab

<https://www.leendertz-lab.org> Vet-Support-P3@rki.de

MATERIALS NEEDED

- printed mask pattern
- cotton(washed) 80X60cm;
2 different (forest)colors
- all-purpose thread
- needle
- scissors
- pins
- tape measure
- pencil

1 & 2. CUT THE PATTERN

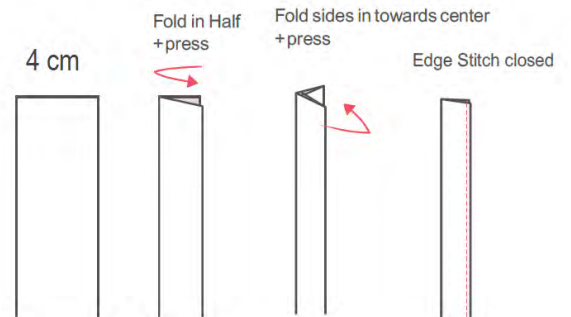


3. FOLD NOSE PIECE



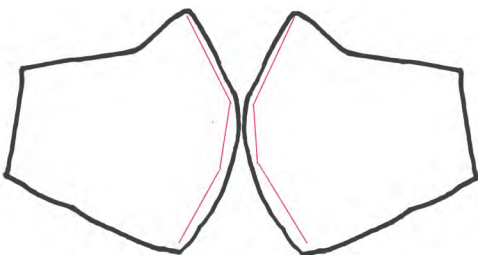
Source: John Hopkins Medicine mask

FOLD & SEW TIES

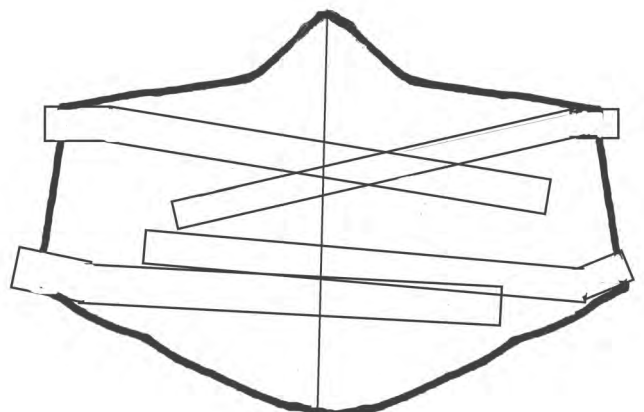


Source: John Hopkins Medicine mask

4. JOIN CENTER SEAM



5. POSITION TIES



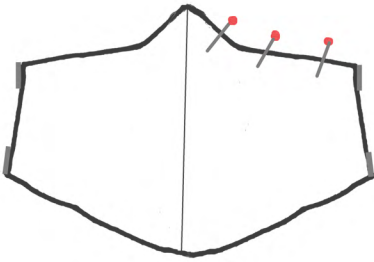
Mask making protocol (2)



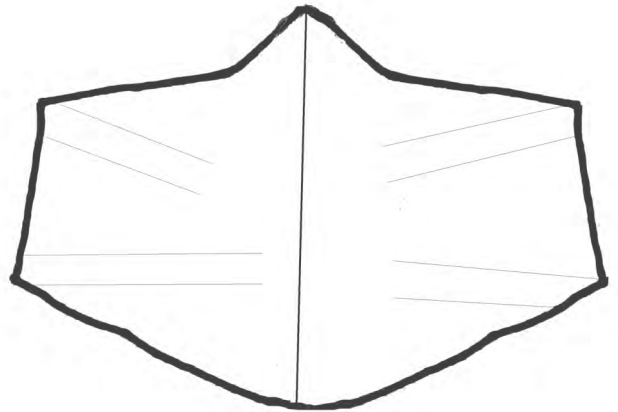
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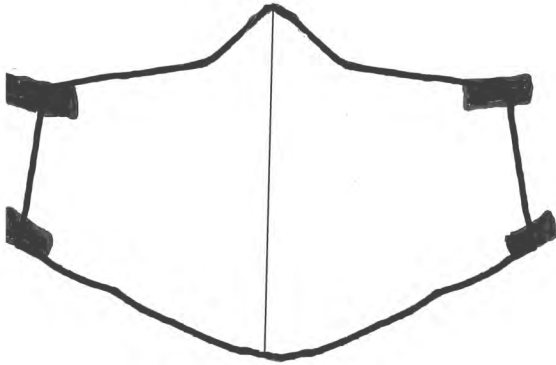
6. PIN THE MASK



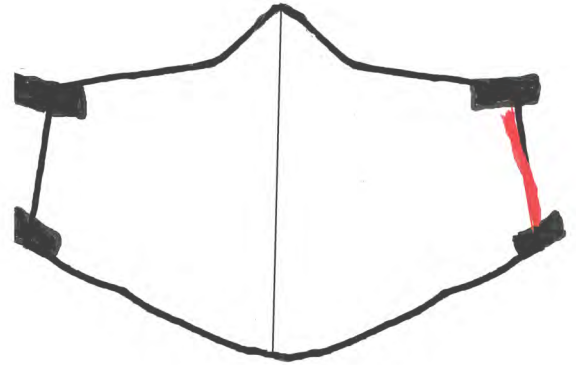
7. SEW THE OUTER TO THE INNER LAYER & TIES



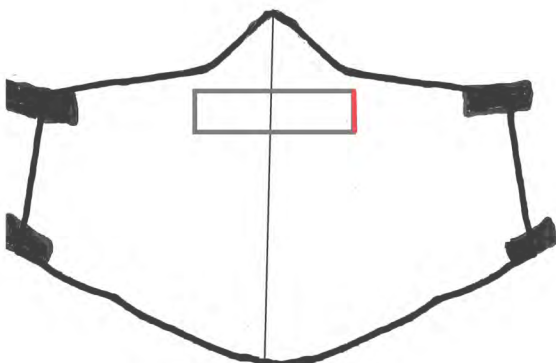
8. TURN THE MASK INSIDE-OUT



9. CLOSE OPEN SIDE



10. ATTACH NOSE PIECE



Ready to use

READ INSTRUCTIONS ON HOW TO USE AND CLEAN THE MASK.



Using a mask

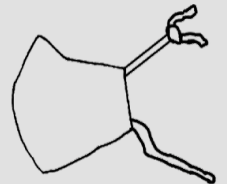
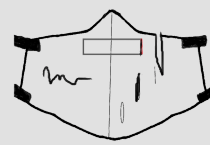
WASH HANDS 40-60 sec

Wash your hand with soap and water or an alcohol-based sanitizer **before** putting on, **when removing** or **after touching** the mask.



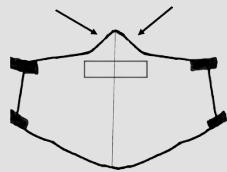
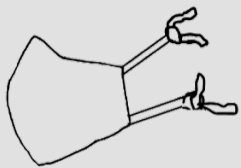
PUT ON THE MASK

1. Check the mask for defects
2. Bring the mask to nose level and tie upper ribbons behind the crown of your head



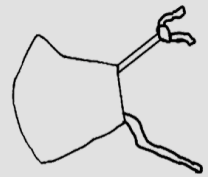
PUT ON THE MASK

4. Take the bottom ties, one in each hand, and tie at the nape of your neck
5. Pull the bottom of the mask over your mouth and chin and check make sure there are no gaps between the mask and your face
6. Pinch nose piece over your nose



REMOVE THE MASK

1. Avoid touching the front side of the mask
2. Untie the bottom ties, then untie the top bow
3. Throw the mask in a closed bin labeled as the used masks bin.
4. Clean your hands.



2



DISPOSE & REPLACE

- Discard the mask immediately in a closed bin before the lunchbreak and replace it with a clean mask after lunch
- Remove mask if soiled or damaged and put on a clean mask.

2/day



CLEANING OF MASK

After use:

- clean with soap & hot water
- clean with soap and cold water and iron it



Leave the mask to dry for at least 24 hours before next use.



24h



Collect & keep clean masks in a closed bin or bag labeled as the clean masks bin.



3.2.19 Reducing disease-transmission with N95 surgical respirator masks

The wearing of surgical facemasks by people coming into proximity with apes in research and tourism projects has been much debated, since one of the biggest risks of human–ape disease transmission comes in the form of air-borne pathogens (Cranfield 2006). Respiratory disease is the most prevalent cause of mortality in some ape populations (Wallis and Lee 1999; Nutter *et al.* 2005; Hanamura *et al.* 2007; Kaur *et al.* 2008; Whittier, Nutter and Stoskopf 2009). In 1999, IGCP's assessment of the mountain gorilla tourism rules (Homsy 1999) recommended increasing the minimum-viewing distance from 5 to 7 metres, on the basis of research on distances that respiratory droplets and aerosolised particles can travel. However, due to concerns about mask management and compliance, the decision to use masks was postponed, pending further evidence of the link between disease transmission and human presence.

When reviewing mask effectiveness, it is important to remember that much of the literature on facemasks assesses protection of the wearer from infection, but in the case of tourism a potentially-infectious person is wearing the mask and our concern is to keep infectious particles *in*, not out. There are a number of pros and cons associated with the use of masks. Positive factors include that under ideal conditions masks are an effective barrier to exhaled pathogens. Although mask effectiveness lessens over time or in less than ideal conditions, the reduction in large particle aerosolisation is still far more effective than wearing nothing. Arguments against the use of masks include the fact that apes must be habituated to visitors wearing them. Tourists also must be educated to ensure compliance, especially as any discomfort associated with the mask could reduce compliance. Under cooler situations, such as at high altitude, poorly fitting masks may cause fogging of glasses and interfere with photography and binocular use⁴. The burden of ensuring mask supply is also a concern, as masks vary in effectiveness, and masks of appropriate quality are essential to the protective properties. Waste management is also an issue, as masks dropped in the forest would become fomites carrying concentrated potentially-infectious particles with significant disease risk.

A number of high-profile disease outbreaks in ape populations have been reported (Wallis and Lee 1999; Ferber 2000; Leendertz *et al.* 2004; Hanamura *et al.* 2007; Hosaka 2008; Köndgen *et al.* 2008), as well as data showing that, in the right wind conditions, contaminated droplets can travel up to three times the recommended 7 metre minimum distance (Cranfield 2006). Reports from multiple sites confirm that the rules established to protect apes from disease transmission are not enforced adequately or consistently and that safe distances are not maintained (Sandbrook and Semple 2006; Dellatore 2007; Nakamura and Nishida 2009). Consequently, there is increasing advocacy for the use of facemasks by great ape researchers, tourists and staff, in addition to other disease prevention measures. This practice is currently more common at research sites, especially those that have experienced fatal disease outbreaks in their study population (e.g., Tai National Park, Côte d'Ivoire); however, use of masks is also on the rise at tourism sites (e.g., chimpanzee tourism in Mahale Mountains National Park, Hanamura *et al.* 2006; mountain gorilla tourism in the DRC and Rwanda, Hurst 2008c; MGVP 2008, 2009).

Masks vary in quality and efficiency. The main differences between a mask and a respirator are that masks fit relatively loosely and protect the wearer from large aerosol particle transmission whereas respirators have a sealing surface and fit tightly over the nose and mouth—they are designed to prevent both small and large particle aerosol transmission (CDC 2004; CDC 2006). N95 respirators are of better quality and have a better fit and seal than basic surgical masks, thereby providing

⁴ MGVP (2008) tested N95 'duck-bill' shaped respirators, which provide more breathing room, and found that they are more comfortable, not as hot and do not cause eyeglasses to fog up as often.



Tourists wearing N95 surgical masks, Virunga National Park, DRC. Photo © Virunga National Park.

improved prevention of aerosolised particle transmission. The better seal of an N95 mask may provide some relief from fogging of camera lenses or binoculars, but conversely the seal may reduce comfort and compliance if tourists feel it is more difficult to breathe. Facial hair is also a problem, as the seal is no longer ensured. Guidance on fitting and wearing of masks must be presented before approaching a group of apes, when the tourists will be rushing. Masks are only effective if they are worn properly.

We recommend that multi-layered, surgical-quality N95 (or higher⁵) respirators be worn whenever tourists or staff approach apes to a distance of 10 metres or less, that these must be properly used and disposed of, and that wearing a mask must not be considered justification for weakening other disease prevention rules. If N95 masks are not available, paper surgical masks may be used. N95 respirator masks cost approximately US\$0.40 each plus the cost of shipping. This is small compared to the overall cost of great ape tourism operations, although the reliability of supply chains has to be assured. Issues of compliance and effectiveness will be critical in the management of masks as part of a disease prevention programme. Compliance, comfort, tourist acceptance and mask disposal should all be monitored and the results used to inform and improve regulations and procedures. For more information on N95 respirators see Appendix II.

⁵ Respirators that filter out higher percentages of aerosolised particles are also acceptable (N99 or N100), but more expensive.

Appendix II – Information on Face Masks/N95 Respirator Masks

Facemasks/Surgical Masks vs. N95 respirator masks: This document has recommended as best practice that all visitors, including staff, tourists and researchers, who approach to a distance of 10 metres or less from wild great apes wear surgical N95 respirators. As there are a large variety of masks on the market, variously called ‘face masks’, ‘surgical masks’ or ‘respirators’, the following information describes the differences in mask types and provides additional information. All of this information is adapted from material produced by human health networks (CDC 2004; CDC 2006; Dreller *et al.* 2006; FDA 2009) and/or adapted from recommendations from great ape veterinary experts (MGVP 2008; MGVP 2009).

Facemasks: A facemask is a loose-fitting, disposable device that creates a physical barrier between the mouth and nose of the wearer and potential contaminants in the immediate environment. Facemasks may be labelled as surgical, laser, isolation, dental or medical procedure masks. Facemasks are made in different thicknesses and with different abilities to protect the wearer from contact with liquids. These properties may also affect how easily the wearer can breathe through the facemask and how well the facemask protects the wearer. If worn properly, a facemask is meant to help block large-particle droplets (greater than 50-100µm diameter), splashes, sprays or splatter that may contain infectious agents from reaching the wearer’s mouth and nose. Facemasks may also help reduce exposure of others to respiratory secretions of the wearer. While a facemask may be effective in blocking splashes and large-particle droplets, a facemask, by design, does not filter or block very small particles in the air that may be transmitted by coughs or sneezes. Facemasks also do not provide complete protection because of the loose fit between the surface of the facemask and the wearer’s face.

N95 Respirators: Although appearing similar to face masks to the layperson, an N95 respirator is a respiratory protective device designed to achieve a close facial fit and efficient filtration of airborne particles including very small airborne particles. The ‘N95’ designation means that in laboratory tests, the respirator blocks at least 95% of very small (less than 10 µm) particles, which include

small particle aerosols generated directly from a cough or sneeze. Mask ratings above N95, i.e. N99 or N100, are also acceptable as they block a higher percentage of particles. An N95 respirator requires a proper fit, tight but comfortable, to the wearer's face to be effective. A proper fit check is relatively simple: when inhaling, the respirator should collapse, and when exhaling there should be no leakage around the face. If properly fitted, the filtration capabilities of N95 respirators exceed those of face masks. However, even a properly fitted N95 respirator does not completely eliminate the risk of disease transmission. N95 respirators are not designed for children or people with facial hair, because a proper fit cannot be achieved. As N95 respirators achieve a tighter facial fit, they may require more effort to breathe and this should be explained to the wearer before use. Some people with chronic respiratory, cardiac, or other medical conditions find it harder to wear N95 masks, but great ape tourism activities, especially those that require strenuous hiking, will probably not attract this sort of tourist. Some N95 models have exhalation valves that can make breathing out easier and help reduce heat build-up, although these will be more expensive. A type of N95 respirator called the Duck-Bill N95 respirator allows more room and has been tested by the MGVP (MGVP 2008) for comfort and reduced fogging of binoculars and glasses.

'Surgical' N95 Respirators: There are N95 respirators sold for use in construction or other dusty situations to protect the wearer from inhaling noxious particles. Surgical quality N95 respirators are approved for use in medical situations and meet additional performance standards for surgical face masks, and therefore it is the 'Surgical N95 Respirator' that is recommended as best practice for great ape tourism.

Mask Information Sources: More information on the types of masks and respirators described above can be found on a number of public health information websites. An excellent resource, including pictures of the different types, can be found at the website below, which also describes in great detail the host, pathogen and environmental factors that affect a particle's infectivity: <http://pandemicflu.gov/plan/healthcare/maskguidancehc.html>

Disposal of Used Masks and Respirators: Masks and respirators may only be used once. Used masks or respirators must be placed in a plastic bag and carried out of great ape habitat or back to a base camp and disposed of hygienically – as they are paper based, they can be burned. Staff members should wash hands or use a hand sanitizer after handling used masks.

Mask Procurement: As this document is intended to be a global resource, it is difficult to provide a list of mask suppliers. Veterinary support networks and relevant public health ministries should be able to provide guidance on mask procurement options in each geographic region.



Ranger wearing a duck-billed N95 surgical mask, Virunga National Park, DRC. Photo © Christina Ellis