

# Personal Protective Equipment (PPE) Olympics



*RxOne Health 2018 Cohort during the PPE Olympics, Bagamoyo, Tanzania*

## Facilitator's Guide

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# Personal Protective Equipment (PPE) Olympics

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## *Summary:*

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This activity offers participants an opportunity to properly put on (don) Personal Protective Equipment (PPE), perform activities that simulate the steps of safe and biosecure wildlife capture, handling, sampling, and sample processing, and then safely take off (doff) PPE. At the end of this activity, participants should be able to competently don and doff PPE for the safe sampling of wild animals in the field.

**One Health Competency Domains:** Outbreak Investigation & Response; Infectious Disease Management; Communication

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## *Learning Objectives:*

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- 1) **Practice donning and doffing field appropriate PPE** for handling wild animals that may be shedding potentially hazardous zoonotic pathogens (tyvek suit, gloves, respiratory protection, eye and other mucosal surface protection, and footwear) in a field setting.
- 2) **Practice simulated activities** representing safe wildlife handling, biological sample collection and sample processing in a field setting while fully donned in appropriate PPE.
- 3) **Experience the challenges of working in a field setting** with a team under realistic field conditions while wearing appropriate PPE.

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## *Time for Completion:*

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Variable. Around 2-3 hours.

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## *Audience & Prerequisites:*

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This activity requires that participants have fundamental knowledge regarding biosafety and biosecurity principles, the types and levels of PPE, conditions and reasons for why and when PPE is required, appropriate level of PPE for an activity based on the environmental conditions and risk, safe specimen collection and handling, as well as a basic knowledge of different types of wildlife trapping methods.

This activity is well suited for 10-25 participants.

Classroom based instruction including didactic lectures or other teaching modalities on the above topics are appropriate as preceding and complementary training material to this activity.

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## *Supplies Needed:*

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- 1) Appropriate PPE supplies in adequate number for participants & instructors (i.e., Tyvek suits (or equivalent), respirators, face shields, gloves, duct tape, shoe covers)
- 2) Spray bottles and hand sanitizer for simulating disinfection of surfaces and PPE
- 3) Handwashing station (i.e., bucket with spigot, water, and soap)
- 4) Small mammal traps (i.e., rodent traps (Sherman or Tomahawk types)
- 5) Mist netting and poles appropriate for either bats or birds depending on targeted species or bird netting
- 6) Leather gloves
- 7) Eggs
- 8) Pipettors
- 9) Forceps
- 10) Colored / tinted liquid (could be water with food dye, juice, etc.)
- 11) Cryovials, Cryoboxes, labels
- 12) Markers
- 13) Peanut butter, refried beans or other semi-solid scoopable non-toxic material (will simulate animal feces)
- 14) List of label numbers/ inventory
- 15) Step by Step PPE Don and Doff Checklist (included at end of this document)
- 16) Several assistants to supervise and facilitate each activity station and provide feedback and assessment of trainee's performance
- 17) Optional (Glow Germ UV liquid<sup>1</sup>, black light)

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<sup>1</sup> <https://www.glogerm.com/>



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- 18) Optional – “Operation” Game<sup>2</sup>
- 19) Optional – Liquid Nitrogen (LN2) storage flask (dewar)

*Facilitator Note:* Activities are all simulations / modified versions of real field sampling activities and can be modified and adapted to local context and supplies available. Instructor creativity and flexibility in designing appropriate scenarios is highly encouraged! The information included in this facilitator's guide is not intended for distribution to participants. This is for your use in preparing and facilitating sessions only. Distributing or verbally disseminating this information directly will take away from the intended experience for the participants.

*Facilitator Note:* Using authentic Tyvek suits for this activity can be expensive and wasteful, particularly in periods of PPE shortages. An alternative is to use much less expensive painters suits, or reusable coveralls. It is important to cover the differences with participants, so they recognize the use of a less protective product is for demonstration purposes only.

#### *Helpful Resources:*

Several helpful resources facilitators might find useful as they consider facilitating a PPE Olympics activity are outlined below, and also linked throughout the document.

- 1) [Biosafety and Personal Protective Equipment \(PPE\) Field Guide](#). This guide was adapted by the OHW-NG project from the [EEIDI](#) and [PREDICT](#) projects' Standard Operating Procedures. It is extensive and an excellent resource for educators teaching this topic and includes a step by step list of donning and doffing steps accompanied by pictures.
- 2) Various Wildlife Sampling Standard Operating Procedures (including [Rodent](#), [Bat](#), [Non-Human Primate](#) & [Avian](#)) These guides were adapted by the OHW-NG project or developed by the [EEIDI](#) and [PREDICT](#) projects and outline procedures to safely capture and sample wildlife, which may be helpful information for trainers before embarking on this activity.
- 3) [WHO \(World Health Organization\) How to Handwash Poster](#)
- 4) [CDC \(Centers for Disease Control and Prevention\) PPE Donning and Doffing Procedures Videos](#) (developed for Ebola preparedness, but very applicable to this activity).

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<sup>2</sup> [https://en.wikipedia.org/wiki/Operation\\_\(game\)](https://en.wikipedia.org/wiki/Operation_(game))

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## *Instructional Sequence*

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**Introduce the exercise.** Prepare participants for the activity they will be participating in. Ask participants to explain their thoughts on the benefits and challenges of wearing PPE during activities like wildlife capture, handling, and sampling. Before beginning the activity, also ask participants to discuss why the order of steps is important during the donning and doffing PPE.

### Donning:

**Instructor demonstrates and leads group in the appropriate donning of PPE,** going through each step individually, making sure to highlight key steps and items to take notice of. (See PPE Donning Step-by-Step Checklist on pages 14-15 of this document and refer to each step).



*Step by step PPE donning, demonstrated and led by Rx One Health 2019 instructor Dr. Brian Bird. Bagamoyo, Tanzania. See supplies for egg-handling station on table. Dr. Zika Sijali prepares for next steps on right.*

**Facilitator Note:** Provide a copy of the PPE don and doff checklist to each participant, so they have a visual reference to follow along with as they work through the exercise. Once all participants are fully donned, write their name on their Tyvek suit in large black letters so classmates and instructors can tell who is who.



*After participants are fully donned, Dr. Bird explains the next steps of the PPE Olympics. Rx One Health 2018*

## PPE Olympics Activities

1) **Warm Up:** As a large group, the group goes on a short walk to simulate traveling to the sampling location. Some light exercise, such as kicking a soccer ball, will help get the group moving and get them “warmed up”. Participants new to wearing full PPE will quickly notice how much harder it is to move around, communicate, see, hear, and how it can get hot quickly.

*Facilitator Note:* \*\* Participants may overheat during these activities and instructors are encouraged to frequently ask participants if they need a break from the simulation to cool down or drink water, etc.



*Rx One Health 2019 Warmups!*

2) **Telephone:** Once participants have become accustomed to moving about in full PPE, play a few rounds of the game of telephone. Starting at one end of the line, one person tells the next person a long number that is easily remembered, such as their phone number. Person #2 tells



the person next to them in line the number, and so on, until the end of the line is reached. At the end, the last person tells the group the number.

This activity demonstrates how challenging it is to effectively communicate with colleagues when in full PPE and without visual stimuli.

Next, split the group up into smaller groups, each about 4-5 people. Rotate through the following activity stations, following the logical sequence of field sampling and sample processing activities, always following proper biosecurity protocols. Based on supplies, context, and location, these can be modified, but the following is an example of what has worked for our group.

*\* Fun Twist:* If available, prior to starting activities at the stations, have an instructor or assistant apply small amounts of [Glo Germ UV liquid](#), which contains plastic simulated germs that glow under UV light, to logically appropriate “contaminated” surfaces that participants might encounter – (i.e. traps, eggs in the mist net, mixed in with the fake feces and blood). After all stations have been completed, and before and after doffing, use a black light to highlight areas of contamination on participants’ hands and clothing.

## Stations:

### 1) Wildlife trap setting

Using available traps such as Sherman and Tomahawk small mammal traps, have participants bait and set traps appropriately, also talking through hazards one might encounter, such as glove tears. The [CDC’s “Methods for trapping and sampling small mammals for virologic testing”](#) is a helpful resource that explains the fundamentals of trap choice and setting.<sup>3</sup>

*Facilitator Note:* A detailed discussion on trap types, proper procedures and trapping considerations is outside the scope of the PPE Olympics, but an appropriate and recommended complementary activity.

*Rx One Health 2021 participants practice setting traps, California.*



<sup>3</sup> Mills, J. N., Childs, J. E., Ksiazek, T. G., Peters, C. J., & Velleca, W. M. (1995). Methods for trapping and sampling small mammals for virologic testing. National Center for Infectious Diseases (U.S.). Division of Viral and Rickettsial Diseases, Centers for Disease Control and Prevention (U.S.). Public Health Practice Program Office. Division of Laboratory Systems. Available at: <https://stacks.cdc.gov/view/cdc/11507>

## 2) Mist Net Egg Detangling

Using some type of finely woven netting material (can be bird netting, mosquito netting, fish net, real mist net, etc.) bunch up a realistic amount of netting material. Within the bunched-up material, tuck 3-4 real chicken eggs. Have the participants work as a group to detangle and extract the eggs, simulating the removal of an animal (i.e., a bird or bat) from a mist net. Participants “handling” the eggs should be wearing leather gloves, others are not allowed to actually touch the eggs if not wearing the leather gloves. Discuss with participants the challenges and issues encountered with maintaining the integrity of PPE when working with live animals entangled in mist nets.



*Rx One Health 2021 participants work in a group to extract eggs from bird netting.*

*\*Note the Glo Germ orange discoloration visible on eggs and leather gloves.*

### 3) Sample Collection

In this station, participants will practice performing fine or delicate tasks, such as playing the game “Operation” (a children’s game that involves removing plastic pieces from small slots in a cartoon on an electrified tray that buzzes when the metal forceps bump the tray). Alternatively, participants can practice moving small delicate pieces of marked rice or grains using forceps from a pile to a test tube, or some other task that requires close vision, concentration, focus and might cause one’s goggles or face shield to fog up. This activity simulates the fine motor skills, coordination and visibility that is required for field tasks such as sample collection from a small animal.



*A Rx One Health 2021 participant practices fine motor skills with the game "Operation." If the metal forceps hit the edges of the game board, a light and buzzer go off!*



#### 4) Pipetting and Sample Handling

Here, have participants practice filling and labeling cryovials with collected specimens. This could include aseptically transferring fake “feces” into cryovials, or pipetting a specified amount of colored liquid (fake blood and/or urine) into cryovials or onto filter paper simulating FTA cards, and then labeling accordingly. If available, participants could also prepare cryovials for transportation in LN2 dewars for storage. This station builds skills in fine tasks, practices use of pipetting equipment, and aseptic transfer of hazardous specimens.



*Rx One Health 2021 participants practice pipetting and filling cryovials with "fake blood" (fruit punch mixed with Glo Germ) and "fake feces" (refried beans mixed with Glo Germ).*

### 5) Cryovial Labeling and Organization

At this final station, participants can work on cryovial organization and handling of large numbers of specimens, learning different ways and rationales of organizing cryoboxes, why this is important, and how to cross reference cryobox contents to known inventory lists.

## Doffing

After each group finishes the series of stations, an instructor talks the group through the proper doffing of PPE, step by step. See checklist on pages 14-15.



*Rx One Health 2021 participants disinfecting gloves as Step 2 of Doffing PPE.*

## Assessment

Providing feedback to participants on their performance and competency assessment during the activity, particularly on the safe and correct use of PPE is important. Throughout the activity stations, facilitators should observe and take note of participants, providing real-time feedback if any obvious breaches in PPE occur, etc. Facilitators may consider making use of a peer-to-peer type of evaluation, where participants are paired with one another and responsible for helping, observing, and providing feedback to each other throughout the activity. Another helpful tool to use is a competency assessment checklist tool, an example of which is included at the end of this document.

## Reflection

Ask participants what they learned from this activity, what was challenging, what they need to practice more of, what they have questions about, etc.

## Go Further

Have participants discuss and think through the logistics of planning a field sampling trip for wildlife disease surveillance in a remote area. What supplies will they need to bring? How will they transport their supplies? Where is PPE equipment procured from? How much do PPE supplies cost? What other types of sampling equipment might be required? How many of each item would they need for a team of 5 people planning a multi-day sampling trip?

## PPE Donning and Doffing Step-by-Step Checklist

- You should already be wearing your dedicated field clothing.
- You must have a second person to check your PPE and make sure it is put on and taken off properly.
- Remember that your brain is the most important part of PPE!!!!
- A step-by-step assessment tool follows this checklist on pages 16-17.
- For additional resources, remember to review the [Biosafety and PPE Field Guide](#).

### Donning (Putting on PPE) – Order of Steps

- 1) Wash hands
- 2) Put on Tyvek coveralls
- 3) Put on Boots or shoe covers
- 4) Put on N95 respirator
- 5) Put on Face shield or goggles (Place over face and eyes (and over prescription glasses if worn). Adjust to fit. Note that prescription glasses are not considered as eye protection)
- 6) Raise hood of Tyvek coveralls
- 7) Put on Apron
- 8) Put on First pair of gloves (this pair must go under the coverall)
  - a. Optional: make small hole for thumb in Tyvek sleeve wrist to keep sleeve down around the wrist
- 9) Put on Second pair of gloves
- 10) Second person checks that your PPE is put on properly

### Doffing (Taking off PPE) – Order of Steps

- 1) Relax and clear your mind... this must be done properly, do not rush!
- 1) Disinfect gloves and obviously soiled areas on PPE with disinfectant spray or germicidal wipes
- 2) Remove Apron
- 3) Disinfect outer gloves with disinfectant spray
- 4) Boots/shoe-covers (if boots are used, after the activity boots should be properly disinfected)
- 5) Remove Outer gloves
- 6) Disinfect inner gloves with alcohol-based hand sanitizer
- 7) Remove Coverall
  - a. Pull back hood
  - b. Unzip
  - c. Invert and roll down coverall
  - d. DO NOT touch the outside of coverall!!!!
- 8) Disinfect inner gloves with alcohol-based hand sanitizer
- 9) Remove Goggles or face shield

- a. These should be place in a bucket with disinfectant or sprayed with disinfectant for reuse
- 10) Disinfect inner gloves with alcohol-based hand sanitizer
- 11) Remove Respirator
- 12) Disinfect inner gloves with alcohol-based hand sanitizer
- 13) Remove Inner gloves
- 14) Wash hands! ([see WHO handwashing guide](#))

*Facilitator Note:* Once PPE is completely doffed and after handwashing, using a UV light the participants can check each other to see if any Glogerm is on their hands, clothing, or any other part of their body.



## Personal Protective Equipment (PPE) Donning and Doffing Competency Assessment Tool

<b>Participant Name:</b>		
<b>DONNING</b>		
Assessment Criteria	Action Item	Performed Correctly?
1) Perform hand hygiene	> Wash hands OR > Use an alcohol-based hand rub	Y / N
2) Put on Tyvek Coveralls	> Ensure coveralls are fully zipped and fully covers all clothing	Y / N
3) Put on boots or shoe covers	> Shoe covers fit over the coverall feet. > Pant legs of dedicated clothing and coveralls should fit over the boots	Y / N
4) Put on N95 respirator	> Position according to training and manufacturers' instructions > Perform fit check – check head movements (Up/down and side to side); Cup hands around edges of PFR, inhale and exhale deeply > If air escaping reposition mask and recheck for air leaks	Y / N
5) Put on Face shield or goggles	> Adjust to fit. Goggles should fit snugly over and around your eyes. > Goggle straps should be adjusted to fit your head	Y / N
6) Raise hood of Tyvek Coveralls	> Pull the hood on your coveralls over your head (or put on the separate head cover if the coveralls do not have a hood)	Y / N
7) Put on Apron	> Tie on the apron over your coveralls; place over head and tie in back	Y / N
8) Put on first pair of gloves	> Inner gloves go under the sleeve of the coveralls; tape glove to sleeve or make a thumb hole in Tyvek to keep sleeve down around wrist	Y / N
9) Put on second pair of gloves	> Outer gloves go on over the first pair and extend over the coverall cuffs.	Y / N
10) Check your buddy	> A second person checks that your PPE is put on properly	Y / N



DOFFING		
Assessment Criteria	Action Item	Performed Correctly?
1) Disinfect gloves and obviously soiled areas on PPE	> Wipe off any visible contamination of the PPE using germicidal or alcohol-based wipes and dispose of the used wipe in the infectious waste bag	Y / N
2) Remove Apron	> Remove and dispose of the apron in the infectious waste bag	Y / N
3) Disinfect outer gloves	> Use disinfectant spray or germicidal wipe to wipe off outer gloves	Y / N
4) Remove boots or shoe covers	> Hold the top of shoe cover and roll them off of your feet; Place the shoe covers in the infectious waste bag. > > Remove boots and place the boots in the equipment collection bag for disinfection and re-use.	Y / N
5) Remove outer gloves	> Using one gloved hand, grasp the outside of the opposite glove near the wrist. Pull and peel the glove inside-out and away from the hand. Hold the removed glove in the opposite gloved hand. Then, slide one or two fingers of the ungloved hand under the wrist of the remaining glove. Peel glove off from the inside, creating a bag for both gloves. > Dispose of the gloves in the infectious waste bag	Y / N
6) Disinfect inner gloves	> Disinfect inner gloves with alcohol-based hand sanitizer	Y / N
7) Remove coveralls	> Pull back hood, unzip and roll down coveralls inside out > Place in infectious waste bag > Do NOT touch outside of the coveralls	Y / N
8) Disinfect inner gloves	> Disinfect inner gloves with alcohol-based hand sanitizer	Y / N
9) Remove goggles or face shield	> Remove by holding the strap > place them in the infectious waste bag or equipment collection bag for disinfection and re-use if re-usable	Y / N
10) Disinfect inner gloves	> Disinfect inner gloves with alcohol-based hand sanitizer	Y / N
11) Remove Respirator	> Remove by grabbing the top and bottom elastic bands; pull bands over your head; or grab nose and pull forward and then off. > Place in infectious waste bag	Y / N
12) Disinfect inner gloves	> Disinfect inner gloves with alcohol-based hand sanitizer	Y / N
13) Remove inner gloves	> Follow same glove removal as step #5 for inner gloves > Place in infectious waste bag	Y / N
14) Wash Hands	> Using soap and water, wash hands and wrists	Y / N
Competency Assessment achieved: Y / N		
Trainer Name:		Trainer Signature:

This tool was adapted from the Government of South Australia's Infection, Prevention and Control; Training Tool for the Correct Use of Personal Protective Equipment (PPE) for Residential Aged Care Facilities. Available at [https://www.sahealth.sa.gov.au/wps/wcm/connect/c1c1a4dd-314b-47a1-940a-b329de0dee31/Training+tool+for+correct+use+PPE+for+RACF\\_v1.2+%28Oct2020%29.pdf?MOD=AJPERES](https://www.sahealth.sa.gov.au/wps/wcm/connect/c1c1a4dd-314b-47a1-940a-b329de0dee31/Training+tool+for+correct+use+PPE+for+RACF_v1.2+%28Oct2020%29.pdf?MOD=AJPERES)

