Experimental research in the department of Human Movement Sciences after the COVID-19 peak

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Contents

1 Introduction

COVID-19 has caused a temporary stop of experiments in the department of Human Movement Sciences (HMS). It is important to plan ahead and investigate if and how we can resume experiments in the department of HMS. This report is made for this purpose. The report is meant as a protocol for the labs of the department, in line with the requirements specified in document 'Toegang in tijden van Corona' (https://tinyurl.com/vubeta-corona-toegangsbeleid), which outlines the procedures for performing experiments in the faculties FGB and BETA. The present document has been written after consultatuion of staff and technicians, to illustrate how the department intends to perform experiments involving human participants, in line with recommendations of RIVM, university board and faculty. Also, it is line with the recommendations of the physiological society, available at https://www.physoc.org/covid19/returning-to-the-lab/. The department is active in a 'slack' domain where information on work in physiology labs in Covid times is shared worldwide.

The current document is intended to support staff of the university, faculty or department in making decisions regarding approval of experiments in the labs of the department of HMS.

Continuation of experiments with human participants is important to enable PhD students and other temporary staff members to finish their projects in time, to fulfil obligations to funding agencies, to address questions of our customers, to enable master and bachelor students to do Research Projects and to contribute to our scientific mission in general.

Experiments in the labs of the department range from human to animal tests, from simple motor tasks to experiments involving strenuous exercise in extreme heat, and from measuring at a distance to invasive measurements. The labs are listed in Appendix 1.

It is assumed that all experiments are VCWE or METC approved and that any adverse event will be reported to VCWE, so that we build a knowledge base on experimenting in the time of Covid-19.

The RIVM measures (https://www.rijksoverheid.nl/onderwerpen/coronavirus-covid-19/nederlandse-maatregelen-tegen-het-coronavirus) (Appendix 2) serve as a guideline for adaptations.

First, it will be discussed how the required distance of 1.5 m between persons (participants and investigators) can be maintained (section 2). Thereafter, the use of personal protective equipment (PPE) will be discussed in section 3. Section 4 addresses hygienic measures. Section 5 outlines labspecific measures, section 6 outlines how to deal with adverse events and section 7 summarizes ideas on experiments with participants in their home environment.

2 Use of lab space

It is documented that the risk of contamination is minimal when interpersonal distance is more than 1.5 m and this is also the first RIVM measure. The following measures are proposed:

1. Everyone that comes to the lab should take this distance into account during transport from and to the lab. In the elevator this is impossible, so everyone should take the stairs to the lab or use the elevator alone.
2. In the labs, walking directions should be marked on the floor to optimize the flow.
3. Markings on the floor should indicate a minimal distance of 1.5 m.

4. Decide how many people are allowed in a certain room based on the 1.5m distance rule and clearly state this on each door/in each space.
5. Work out how to maximize the use of all the space, while maintaining safety and adhering to government guidelines.
6. The distance can be less when there is no open space in between, but for instance a Perspex wall that is cleaned regularly.
7. For measurements, instruct the subjects to apply sensors on the body themselves.
   - Core temperature: esophageal probes have to be inserted preferably by the participant under vocal guidance of the investigator;
   - Skin sensors: Instruct subjects where to locate the sensors; for instance ibuttons markers and tape are prepared for the participants. The participant puts them on the skin according to an instruction video; sensors on the back can be applied using a booth (see point 8);
   - Heart rate band and watch can be donned and doffed by the participants;
   - Cosmed mouthpiece and the tube are cleaned prior to the experiment using Dettol and are applied by the participants.
   - Markers for motion analysis. If positions are within reach and if precision of placement is not crucial, subjects can apply markers themselves. Instruct subjects where to locate the sensors (video may be useful). All materials should be prepared by the researcher, who also supervises placement of markers from 1.5 m distance.
8. Consider for every measurement tool if the subject can operate the tool; if not and if the distance between the investigator and the subject becomes too small, consider using a booth (fig. 2). These can be made by the technical staff.

Fig. 2 Booth to access subjects safely from close distance.

3 Personal protective equipment

When the distance cannot be maintained and when access using a booth is not possible, the investigator wears PPE. This consists of:

1. Nytril or rubber gloves
2. Glasses or a face shield
3. A face mask
4. An apron

Investigators who have to wear PPE should be trained in donning and doffing and show competence. Information is available at https://www.cdc.gov/coronavirus/2019-ncov/hcp/using-ppe.html.

Sufficient supply of PPE should be available before an experiment can start.

4 Hygiene

The following measures are proposed:

1. Have hand disinfectant and paper towels ready at the entrance of the lab
2. Consider replacing all chairs with plastic chairs for ease of cleaning
3. Sweat may contain the virus so any sweat on any surface should be removed
4. All participants and instructors wash their hands prior to and after the experiment
5. All measurement sensors and reading devices are cleaned with alcohol or dettol
6. Even during maximum exercise tests, a distance of 1.5 m with the participant is maintained
7. After strenuous exertion in experiments, participants MUST shower.

5 Specific lab measures

5.1 Human Performance Lab (HPL)

Fig. 1 shows the walking direction for the HPL. The climate chamber (klimaatkamer of 3 x 4 m – fig.1) can host one subject and one experimenter.

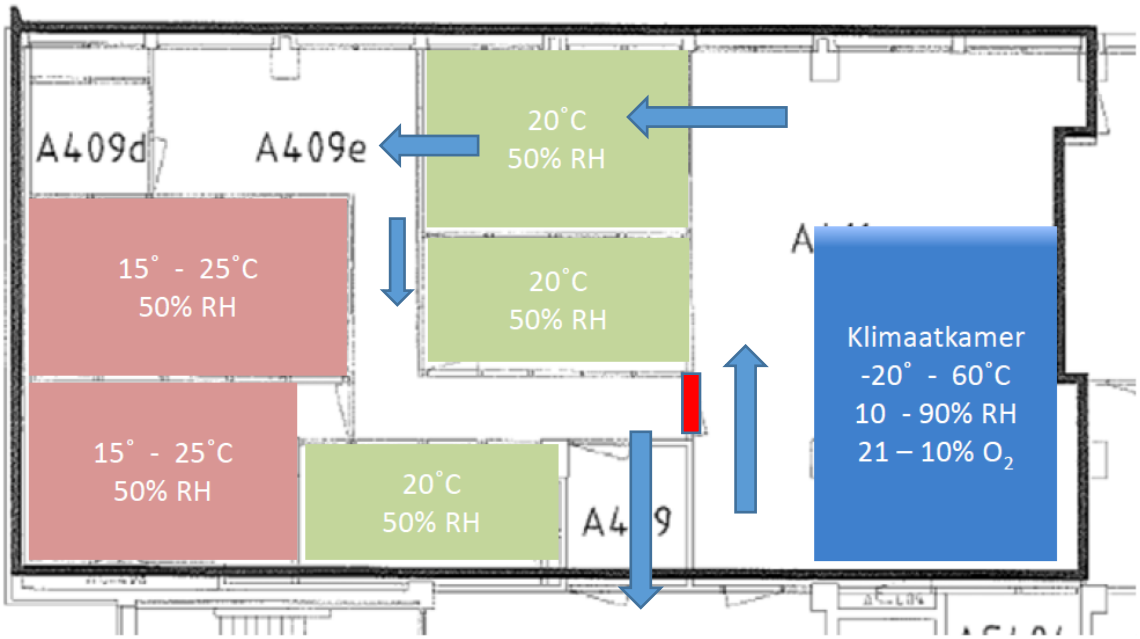


Fig. 1 Example of walking flow indicated by arrows in the Human Performance Lab. The red bar is a door that should not be used.

The computer terminals in the upper green room of Fig. 1 will be set apart to meet social distancing requirements.

5.2 Lab H669

In this lab the first walking patterns of babies are investigated by Dr. Dominici. Three adults and a baby are present in the room. One parent is essential with the baby (it is not allowed to do the measurements without the parent), 1 experimenter will be in contact and close contact with the parent/baby, the second experimenter will remain confined around the computer station without a close contact with the parent/baby. We will arrange the lab in a way that there will be at least 1-1.5m distance from this experimenter (area around the computer station) and the recording area.

6 Adverse events

Proposed rules are:

1. Any adverse event will be reported to the VCWE or METC;
2. When the investigator has any symptoms of COVID-19 (dry cough, fever, no smell and taste) he or she stays in quarantine at home for two weeks;
3. The participant has to indicate if he/she has any symptoms of covid-19 prior to the visit of the lab. If this is the case, the participant cannot participate and will receive the financial compensation when appropriate;
4. In case of emergency (the participant tends to faint or faints), the 1.5 m distance is no longer maintained and direct support is given to the participant. For every emergency action: own safety first, see https://www.nibhv.nl/nieuws/corona-virus-updates/

7 Research at a distance

With all the measures that have to be taken to enable research in the labs, the alternative of measuring subjects in their homes or other 'field' settings becomes more attractive. Research in the lab allows for controlled environments and manipulation of a single variable so that causal relations can be established. Since control is more difficult to achieve in research in field settings, the number of subjects generally has to be higher to achieve sufficient statistical power. Also, the use of equipment has to be minimized and it needs to be easy to use to allow experiments in the field.

Examples of experiments that can be performed in home settings are:

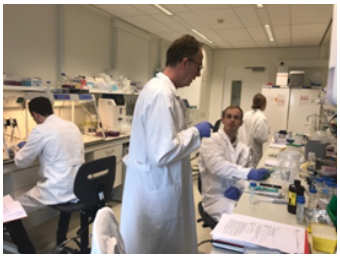
- Interviews using conference tools like zoom
- Simple movement registration using trackers like IMUs
- Physiological monitoring for instance skin temperature using ibuttons, core temperature using the eCelcius system, heart rate etc.

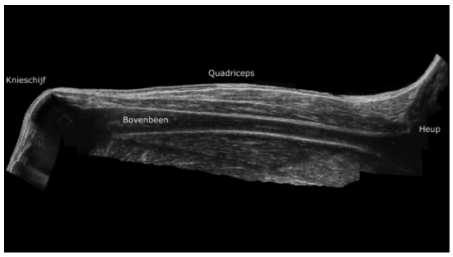
Appendix 1 – Labs

The three main research facilities include:

1 A large **measurement hall** at the 6th floor of the medical faculty with cycle ergometers, treadmill (also applicable for wheelchairs), computer driven robot arm, climbing wall, force plates, 3D movement registration systems.

2 A **muscle physiology lab** (O | 2 building). Here research is conducted regarding mechanisms underlying mechanical, and metabolic properties of the skeleto-muscular system and how these systems adapt to changes in physical load and metabolism. Application areas are clinical science (e.g. Duchenne muscle dystrophy, heart failure, diabetes), exercise, inactivity, and nutritional and pharmacological interventions. The facilities include physiological measurement systems for cultured cells, animals and humans, such as a culture room, animal surgery and muscle mechanics, spirometry, histology, molecular physiology and 3D ultrasound systems. This is combined with state-of-the-art imaging techniques , and other molecular techniques available in the core facilities of the O|2 building. Also, the lab has facilities for swimming- and running training for small animals. Studies are conducted using genetically modified animals, and animals with diabetes and other chronic diseases. Muscle fibers and muscle stem cells oxygen tension and mechanical load can be controlled. Molecular, histological and biochemical analyses can be performed (e.g., qPCR, HPLC, Western blotting and immune- and enzyme histochemistry). Microscopic techniques for cells and tissue include bright field fluorescence and super-resolution microscopy.





3 An **exercise physiology lab** (4th floor of medical faculty) including climate controlled rooms (-20 to +60°C, humidity control, oxygen control up to 5800m simulated altitude) with electrically braked bicycles, treadmill, thermal monitoring equipment, near infrared spectrography and gas analysis (Cosmed and Oxycon).

A detailed list of the rooms linked to research is shown below:

Wing	Floor	Room	Sub	Lab-function	Lab-coordinator
A	6	601			John van der Kamp
A	6	605			John van der Kamp
A	6	609			David Mann
A	6	629			Eli Brenner
B	6	645		Loopzaal	Leon Schutte
H	6	669			Nadia Dominici
A	4	409	a	HPL -chair	
A	4	409	b	HPL - chair2	
A	4	409	c	HPL - exercise	
A	4	409	d	HPL - kitchen	
A	4	409	e	HPL - students	
A	4	409	f	HPL - antro	
A	4	411		Climatic chamber	
C	4	472		Balance-lab	Jaap van Dieën
C	4	477			
C	4	478		Dualbelt-lab	Sjoerd Bruijn
C	4	479		VR-lab	Katinka van der Kooij
C	4	482	a	Fysio-lab	Annelies Pool
C	4	482	b		John Stins
C	4	487			
G	4	418		Education	Brenda van Keeken
G	4	424		Education	Brenda van Keeken
G	4	430		Spin-Off company	
H	4	432		TA1	Jaap van Dieën
H	4	436			Eli Brenner
E	K	09		Pool (like in bath)	

A detailed list of the rooms in Trans linked to research is shown below:

Wing	Floor	Room	Sub	Lab-function	Lab-coordinator
E	K1	46	A - I	Cubicle 1	
B	K2	74	C - R	Cubicle 2	J. Tybur
D	K2	20		Observation	
D	K2	25		Cardio 1	
D	K2	26		EEG 1	
D	K2	29		Cardio 2	
D	K2	30		EEG 2	
D	K2	34		EEG 3	
D	K2	35		Eyelink 1	
D	K2	37		Eyelink 2	
D	K2	38		Eyelink 3	
D	K2	42	A - E	Cubicle 3	J. Tybur
D	K2	71	A – F	Cubicle 5	
D	K2	72		Multipurpose 2	
D	K2	74		Multipurpose 3	
E	K2	17	A - K	Cubicle 4	J. Tybur
E	K2	37		Data analysis	
E	K2	41		Multipurpose 1	

A detailed list of the rooms in O2 linked to research is shown below:

Wing	Floor	Room	Sub	Lab-function	Lab-coordinator
W	13	27		Natlab	
W	13	28		Washroom	
W	13	31		Cell culture	
W	13	33		Microscope-room	
W	13	35		Biopsy-room	
W	13	35	A	Pre-PCR	
W	13	37		Histo-lab	
W	13	39		Physiological measurement room 1	
W	13	41		Physiological measurement room 2	

Appendix 2 – Covid-19 guidelines of RIVM

March 31, 2020

Government of the Netherlands

Measures to combat coronavirus

Stay home as much as possible.

Keep your distance (1.5 m).

Wash your hands frequently.

Cough and sneeze into your elbow.

Use paper tissues.

Don't shake hands.

If you have cold-like symptoms, stay home until you have recovered.
If you are short of breath and/or have a fever, your whole household must stay home.

Limit contact with others:

Leave your home only to buy groceries, get some fresh air or take care of others.

Work from home if you can.

Gathering in groups of more than two is only allowed if you keep 1.5 metres from each other.

Exemptions apply to people living in one household and children aged 12 or under.

Limitations to public life:

Up to and including 28 April 2020:

- Schools and childcare centres are closed.
- All eating and drinking establishments are closed. Takeaway and deliveries are permitted.
- Sports and fitness centres, saunas, casinos, amusement arcades and sex establishments are closed.
- Public places such as museums, concert venues and theatres are closed.
- ✕ Anyone in a contact-based role who is unable to maintain a distance of 1.5 metres (like hairdressers and masseurs) must stop performing their job.
- ✕ Gatherings are forbidden.
- ✓ Shops, markets and public transport companies must take measures to ensure that people maintain distance from each other.

Until 1 June 2020:

- ✕ All events for which organisers would normally be required to apply for a permit or notify the authorities are banned.

alleen samen krijgen we corona onder controle

More information:
government.nl/coronavirus
or call 0800-1351