

A close-up photograph of a laboratory setting. Several pipettes are shown in the foreground, some with blue liquid being dispensed into a multi-well plate. In the background, there are petri dishes, one containing a pinkish-purple liquid. The lighting is bright and focused on the pipettes, creating a professional and scientific atmosphere.

Trending topics in Occupational Health for laboratory workers

Dr. med. Giovanna Ales

Outline of the presentation

- **Occupational Medicine at UZH**
- **Skin protection: old topic but still current**
- **Novel Treatment of a Vaccinia Virus Infection from an Occupational Needlestick- San Diego, California, 2019**
MMWR Morb Mortal Wkly Rep. 2019 Oct 25;68(42):943-946. Whitehouse et al.

Occupational Medicine at UZH

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Working Days:

Wednesday, Thursday and Friday.



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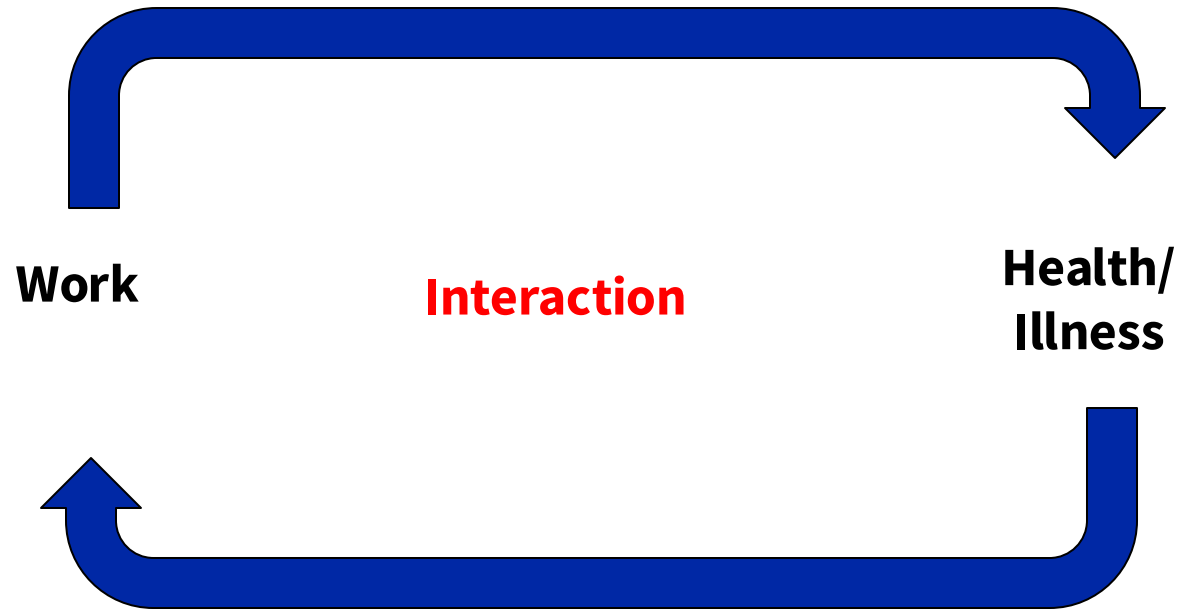
Working Days:

Tuesday, Wednesday, Thursday.
(Monday upon request)



Definition

The mutual interaction between **work and occupation** on the one hand, and individuals, their **health**, and their illnesses on the other.



Objective

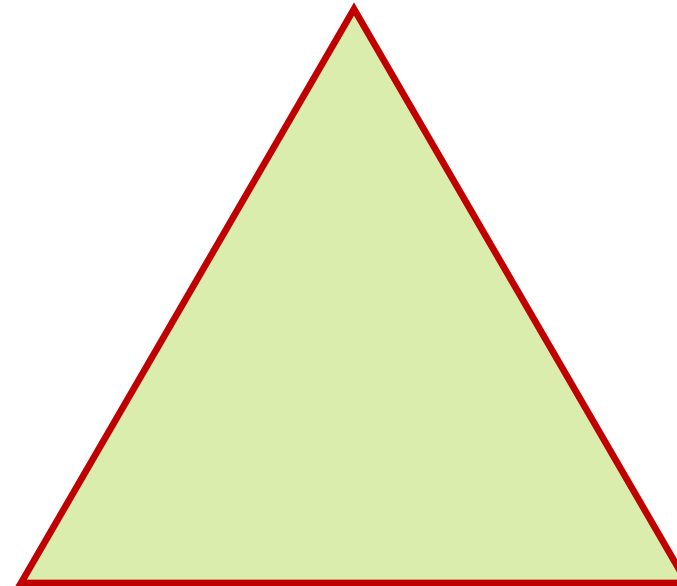
The aim of occupational medicine is to **maintain and promote** the **physical, mental, and social well-being** of employees.

Injury/illness Prevention

- Consultation
- Behavioral Prevention

Harm Reduction

- Identification of Risk Factors
- Early Detection of Diseases



Damage Assessment

- Medical / Occupational Rehabilitation

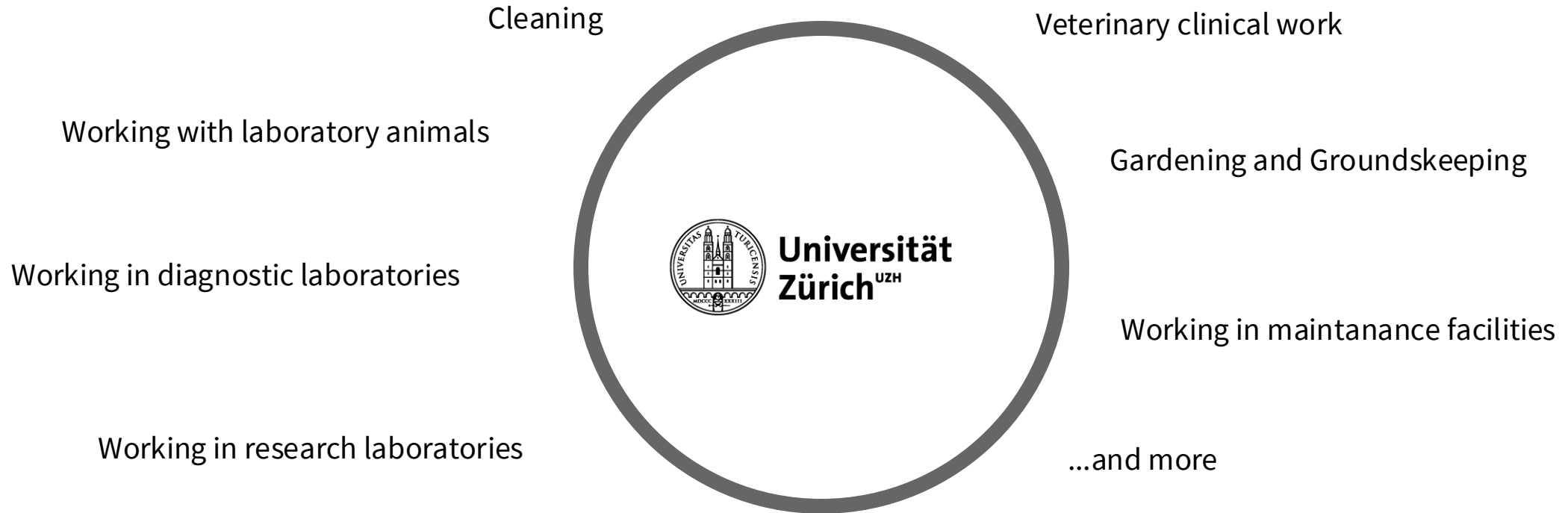
General Responsibilities in Occupational Health

- Prevention of work-related illnesses
- Promotion of health in the workplace
- Identification of health and performance related factors
- Development of improvement measures and efficiency control

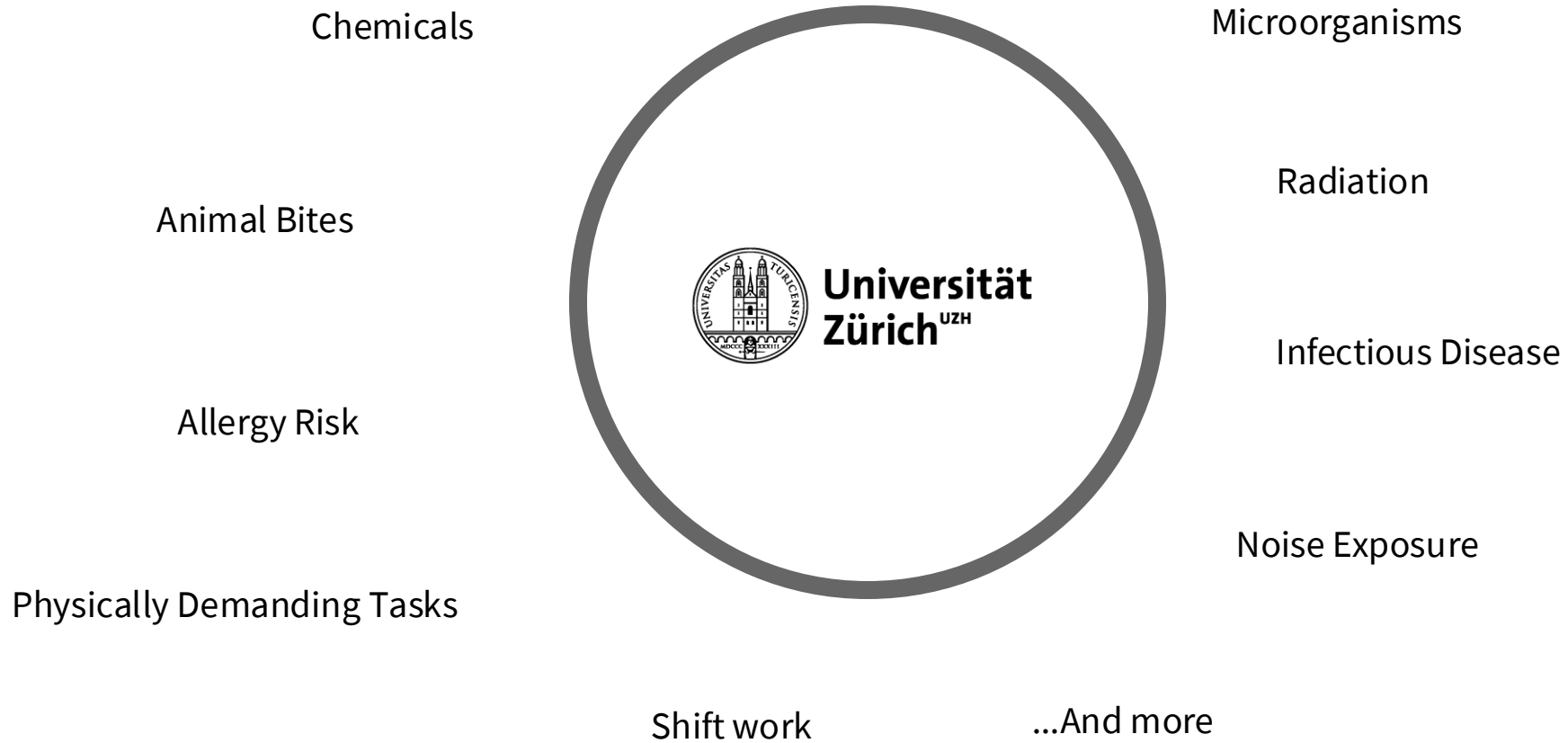
General Responsibilities in Occupational Medicine

- Consultation on workspace planning, acquisition or modification of tools and equipment (e.g., ergonomic chairs)
- Consultation on work process changes, introduction of new materials, and protective equipment
- Support with job transitions and reintegration
- Hazard assessment, prevention, and accident prevention

Diverse Work Environments



Workplace Hazards



Occupational Health Consultations

- Maintaining a health record according to SAMV
- Biological risks (working with microorganisms, human samples,...)
- Chemical/ Physical Risks
(hazardous substances, ionizing radiations)
- Working with animals/ Laboratory animals (Allergy Risk)
- Personal conditions (chronic illnesses,...)

Examples

- Cleanroom examinations, suitability assessments for BL3/ BL4 laboratories, activity with primates
- Employees may only be allowed to work in these settings under certain conditions

How to book an occupational health consultation:

<https://www.su.uzh.ch/de/unsere-aufgaben/arbeits-sicherheit-gesundheitsschutz/arbeitsmedizin/agenda.html>



Not new, but nevertheless current: skin protection

Occupational Skin Disease

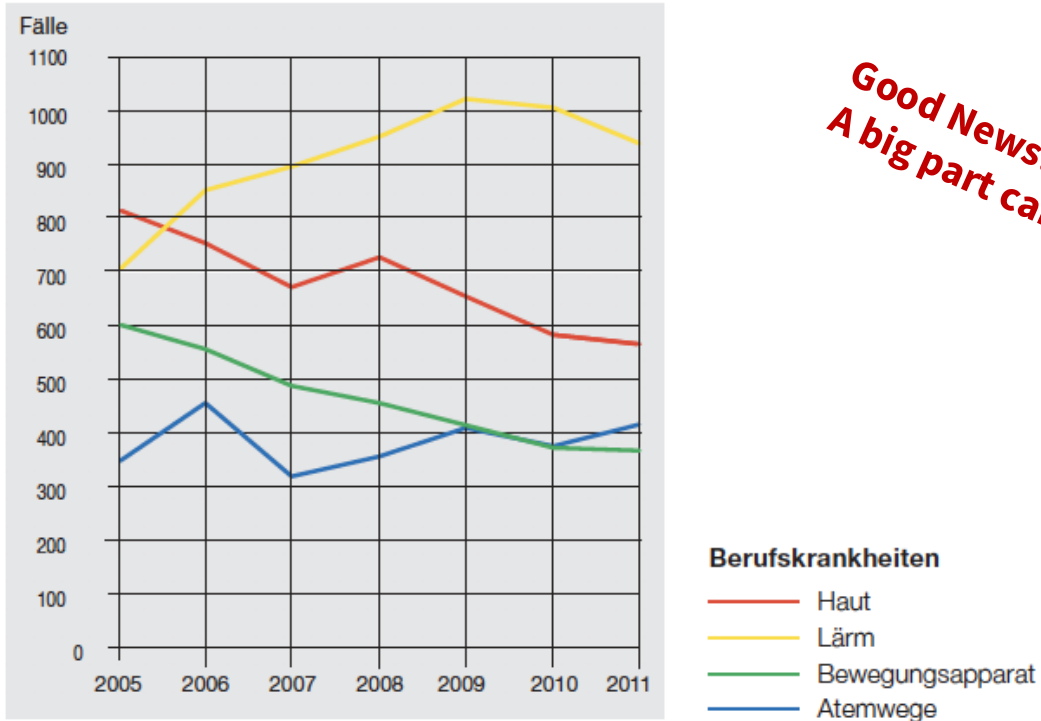


Bild 1: In der Schweiz war die Anzahl berufsbedingter Hautkrankheiten in den letzten Jahren anhaltend hoch.

Oftentimes underestimated: about 1/5 of the recorded occupational diseases affect the skin

**Good News:
A big part can be prevented by adopting a correct behavior!**

Most common forms:

→ Irritant contact dermatitis

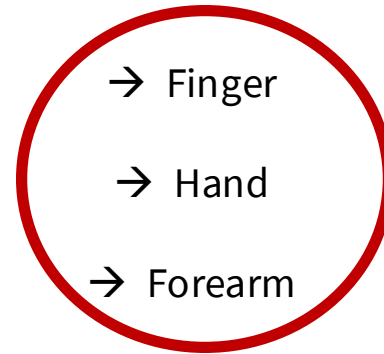
→ Allergic contact dermatitis

Which tasks can be potentially dangerous for the skin?

Activities in which...

- ... Hands are **exposed to moisture** for more than 2 hours a day (Wet Work)
- ... **Liquid-proof gloves** must be worn for more than 2 hours
- ... Hands must be **cleaned frequently or intensively**
- ... Skin may come into **contact with harmful substances** such as alkaline or strongly acidic solutions, disinfectants or organic solvents.
- ... Skin may be exposed to **chemical or physical irritants** such as: cold, heat, dust, metal chips or mineral fibers

Parts of the body most commonly affected by skin diseases:



- Finger
- Hand
- Forearm
- Neck
- Face



Foto: Cunaplus_M.Faba / iStock

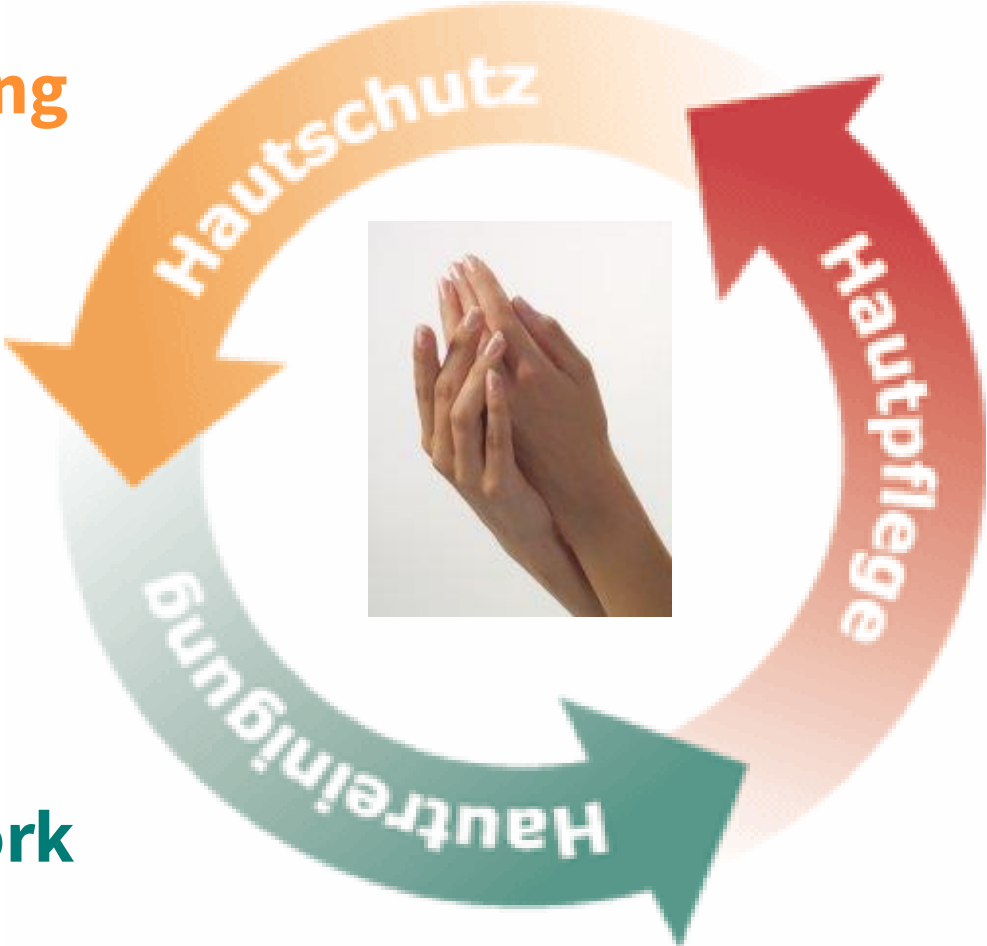
Initial stage



SUVA

Chronic stage

**Before work and
after each washing**



During Work

After work

How does protective cream work?

Reduction of the irritant potential of contaminants and chemicals

Barrier function: Insolubility of irritants in the skin protection product

Reduces irritant access to the skin (**easier post exposure hand washing**)

Improves overall skin condition (**protection through care**)

How to apply skin protection agents correctly



1. Apply a pea-size amount on the back of the hand

2. Rub in the lotion evenly

3. Spread also on fingers

4. Don't forget Finger nails!

5. Spread gently between fingers!

6. Gently press your hands together and spread evenly.

Skin cleansing

Every hand washing event damages the skin acid mantle and its barrier function

→ The skin is more sensitive to damage from irritants

**Use the less abrasive detergent that serves the purpose
The gentlest the better!**

→ Wash hands with skin friendly products and rinse well

→ Dry hands carefully

→ Apply hand cream

Skin Care

- Apply **after** work
- Helps **Skin health restoration** during stress-free time
- Helps maintain skin **elastic and smooth**
- Strengthens skin **resistance** against natural environmental irritants
- Skin care and protection are also important **outside the workplace**



Produkte SCM Shop

Skin protection plan Summary

Skin Protection Measures:

Protect - Clean - Care

Before starting work:

Apply barrier cream

During breaks and at lunchtime:

Wash hands (apply a protective cream)

After work:

Clean and apply a hand conditioning cream.

Further possible measures

Replacement of dangerous substances with harmless ones.



These hazard pictograms indicate skin damage effect

**...or protect yourself with PPE
(wear suitable gloves!)**

H-Sätze	
H310	Lebensgefahr bei Hautkontakt
H311	Giftig bei Hautkontakt
H312	Gesundheitsschädlich bei Hautkontakt
H314	Verursacht schwere Verätzungen der Haut und schwere Augenschäden.
H315	Verursacht Hautreizungen.
H317	Kann allergische Hautreaktionen verursachen.
H340	Kann genetische Defekte verursachen.
H341	Kann vermutlich genetische Defekte verursachen.
H350	Kann Krebs erzeugen.
H351	Kann vermutlich Krebs erzeugen.
H360	Kann die Fruchtbarkeit beeinträchtigen oder das Kind im Mutterleib schädigen.
H361	Kann vermutlich die Fruchtbarkeit beeinträchtigen oder das Kind im Mutterleib schädigen.
EUH066	Wiederholter Kontakt kann zu spröder oder rissiger Haut führen.
EUH203	Enthält Chrom (VI). Kann allergische Reaktionen hervorrufen.
EUH205	Enthält epoxidhaltige Verbindungen. Kann allergische Reaktionen hervorrufen.

Novel Treatment of a Vaccinia Virus Infection from an Occupational Needlestick- San Diego, California,

2019 MMWR Morb Mortal Wkly Rep. 2019 Oct 25;68(42):943-946. Whitehouse et al.

Case report:

26 year old healthy female laboratorian **working with Vaccinia Virus (VACV)** in San Diego, California

09/2018 Before starting working with VACV was offered **vaccination** with ACAM2000, but **declined**.

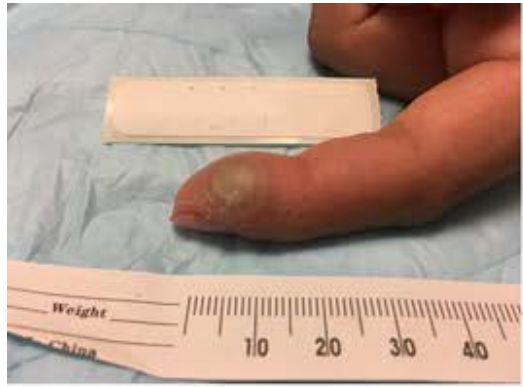
12/2018 Needlestick injury from the same needle used to inject VACV into the tail of a mouse.

Immediate Measures:

Rinsing for 15 minutes with water, visit at the local emergency department.

Between days 2 and 9 post infection: two further medical consultations, no advice on contact precautions or auto inoculation prevention.

Day 10: Evaluation at an Occupational Health Clinic: swelling and single vesicular lesion; discussion with official authorities (CDC and the County of San Diego Health and Human Services Agency); advice on wound monitoring for signs of infection worsening.



Day 11



Day 25



Day 57



Day 94

Day 12 Evaluation at a university emergency department: fever, lymphadenopathy, malaise, pain and worsening edema. Possible complications: compartment syndrome, joint infection and further spreading of the infection.

Therapy

i.v. vaccinia immunoglobulins + 14 day oral therapy with Tecovirimat + antibiotic therapy

→ Within 48 hours of treatment initiation there was a significant improvement in patients condition

→ Areas of necrotic tissue did not fully resolve until day 94

Vaccinia Virus: is an Orthopoxvirus used in small pox vaccines; as a vector for novel cancer treatments and for experimental vaccine research

The Advisory Committee on Immunization Practices (ACIP) recommends **smallpox vaccination** for laboratory workers who handle **replication-competent VACV**

Genetic engineering work with **recombinant vaccinia** is regarded by the ZKBS (Zentrale Kommission für die Biologische Sicherheit) as **biosafety level 2**

Modified **Vaccinia virus Ankara (MVA)** is a highly attenuated strain of VACV and is avirulent for both humans and animals. MVA has been assigned by the ZKBS to risk group 1

refer to	Ectromelia virus		
Vaccinia virus		2	PHV
Buffalopox virus		2	PHV
Modified vaccinia virus Ankara "MVA"		1	
NYVAC		1	
Rabbitpox virus		2	PHV
Variola virus		4	PH VAR

ZKBS Recommendations

- Use **low virulence vaccinia viruses** : MVA, highly attenuated strains NYVAC und ALVAC
- Protect **uncovered skin** from splashes (safety cabinet, protective clothing, protective gloves, appropriate face shield).

Higher risk of Infection

- Activities with laboratory animals (bites, needlesick injury or splash from the injection)
 - Activities which involve the manipulation of large volumes and concentrations of recombinant vaccinia virus.
- In animal husbandry facilities and in the production area special safety measures must be observed:
- Use of special systems for animal husbandry (individually ventilated cages, IVCs)
 - Use of restraint equipment for safe animal handling
 - Activities with risk of aerosol formation: use microbiological safety cabinet
- Possibility of **Vaccine prophylaxis** using a replication incompetent MVA strain

Importance of providing counselling to workers before work start

→ Discuss risks and possible consequences of an infection

→ How can one protect himself

→ Information on emergency procedures, if possible providing an information factsheet

Information for new employees at UZH

Legal Basis:

SAMV: **Verordnung** über den **Schutz** der **Arbeitnehmerinnen** und **Arbeitnehmer** vor Gefährdung durch **Mikroorganismen**. (Ordinance on the protection of workers against risks from microorganisms)

Working with Microorganisms for which a vaccination is available: The employer must cover the costs

SAMV Art. 14:

- (1) **Risk analysis:** are **Occupational Health protection measures** necessary? When an employee must handle or work with a microorganism for which he has no immunity he must receive an effective vaccination at the employer's expense.
- (2) A special **health record** must be kept for employees subject to **special occupational health and safety measures**

**Employees with special protective measures :
medical record must be filled out !**

Vaccination Concept UZH

Tätigkeitsgebiet	Hepatitis A	Hepatitis B (Titerkontrolle)	Tollwut	Tetanus (Diphtherie)	Pertussis	FSME (je nach Endemie- gebiet)	Influenza	Meningok okken	MMR (Masern, Mumps Röteln)	Varizellen	Andere/ Anmerkungen
Umgang mit menschlichem Blut, Körperflüssigkeiten und Gewebe		X									
Diagnostische Laboratorien		X						X		X Virolog. Diagnostik	
- Umgang mit Blutkulturen								X			
- Umgang mit humanen Stuhlproben	X										
Gezielte Forschungstätigkeit mit humanpathogenen Kei- men											Polio-Impfung Tollwut, Meningokokken... Je nach eingesetzten Mikroorganismen
Umgang mit Tieren: - Labortiere				X	(X)						Je nach „Herkunft“ der Tiere (Wildtyp ← → Zucht)
- Primaten (Labor)	X	X		X	X				X	X	
- Haus- und Nutztieren (Tierspital)			X	X							
- Fledermäusen			X	X							
- Wasser-/Hausgeflügel, Vögeln, Schweinen				X			X				
Arbeit in der Natur, Gärtnerei (Kontakt Zecken)				X		X					
Umgang mit Spitalpatienten	Gemäss Impfkonzept USZ										
Zahnmedizin / ZZM		X		X	Kontakt Kleinkinder		X		X	X	
Berufl. Einsätze											Empfehlungen des beratenden Arztes; länderspezifisch

Thank you for your attention!