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**VIII Kongress Katastrophenmedizin**

**Brno 7. / 8. 02. 2013**

**Decontamination**

**Cooperation of Firebrigaders and Rescuers**

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**Tuebingen**



[www.disastermedicine.com](http://www.disastermedicine.com)

# Zivilschutz- Forschung

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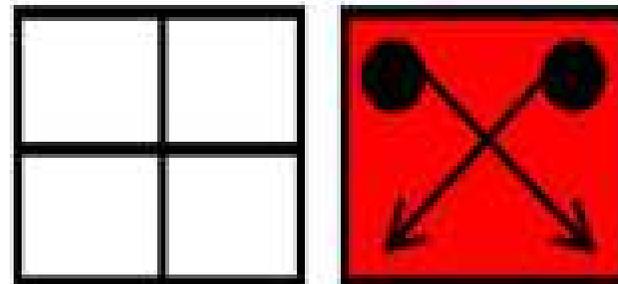
**Aufbau und Ablauf der  
Dekontamination und  
Notfallversorgung Verletzter bei  
Zwischenfällen mit  
chemischen Gefahrstoffen**

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## Rahmenkonzept zur Dekontamination verletzter Personen

der  
Bund-Länder-Arbeitsgruppe



**Endfassung**

September 2006



**Saringasattentat in  
der U-Bahn von Tokio**

**secondary contamination of rescuers during  
the sarin attack in Tokyo:  
St. Luke`s Hospital (600 beds)**

	<b>%</b>	<b>incapable to work</b>
<b>on site</b>	<b>135(9,9%) of 1364</b>	<b>rescue personnel</b>
<b>hospital</b>	<b>110(23%) of 472</b>	<b>hospital staff</b>



# Aerea of Danger



Entsorgung - schnell und billig

Safety Distance,  
Respiration of  
Compressed Air

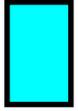
PPE mandatory



Fire Brigade

White Zone

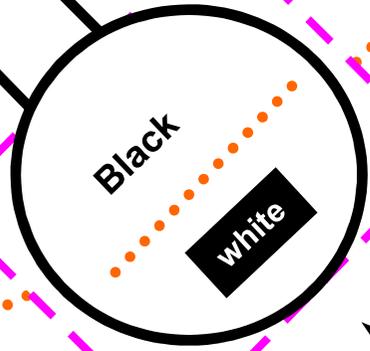
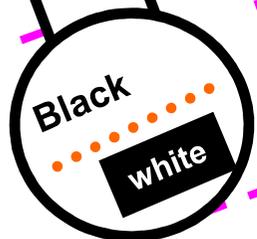
Rescue Personnel



Material Storage



Injured



Decontamination and Detection

Wind

# Dilemma of Decontamination

## Cooperation

## Communication

Firebrigader:

We are able to decontaminate but not  
in case of injured patients

Rescue Personell:

We are able to treat injured patients but  
not in case of contamination

# Ranking for Chemical Stratification

*STANAG, CDC, GHSI, BMI*

- Toxicity (*acute*: LD50, LDC50), (*chronic*: DNA, Carcinogenesis)
- Ease of Synthesis
- Acquisition of Agents and Precursors
- Ease of Dissemination
- Threat Analysis
- Ease of Detection
- Incident Management
- Release Environment
- Antidotes
- Decontamination
- Persistence
- Risk Perception
- Public Preconception



•Aphids

# Organophosphate poisoning causes three syndromes

The **Cholinergic Syndrome**, which can be fatal, happens soon after organophosphates are swallowed, inhaled, or absorbed through the skin.

The **Intermediate Syndrome (IMS)**, which results in muscle weakness in the limbs, neck, and throat, develops in some patients 24–96 hours after poisoning.

Finally, the **Organophosphate Induced Chronic Neuropathy (OPICNP)** long-term nerve damage sometimes develops 2–3 weeks after poisoning

**Is a Chemical Toxicant Involved?**

**Is it an Organophosphate or not?**

**Recognition and Treatment of Toxidromes**  
***Signs for a Chemical Event?***

**Yes**

***Self Protection***

***Clinical Identification OP or not OP***

**OP**

**not OP**

***Autoinjection***

***Only Symptomatic Tr.***

**– Atropin**

**Airways**

**– Diacepam**

**Disrobement**

**– Pralidoxim**

**Decontamination**

**– +**

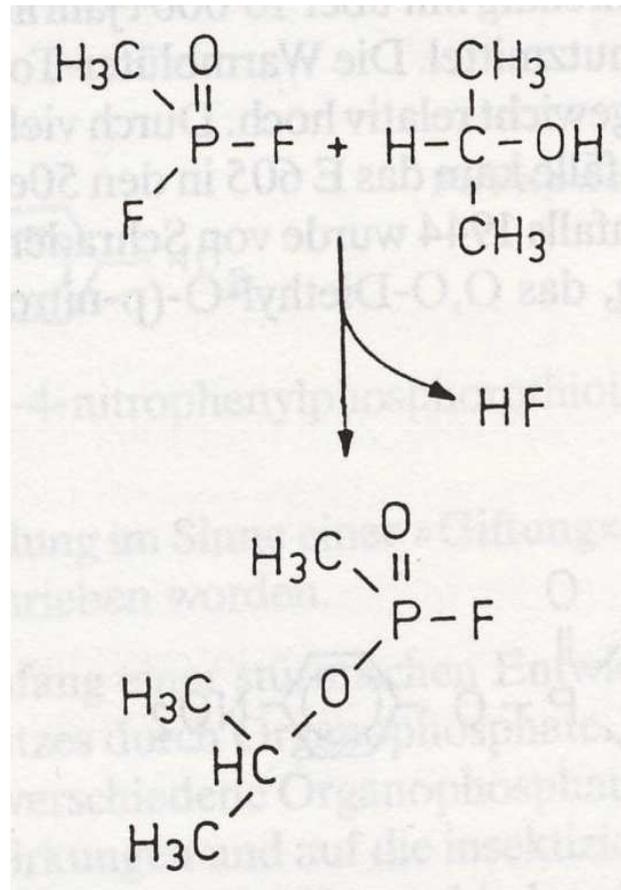
***Symtom. Tr.***

# Sarin a Binary Weapon

**Methylphosphono**

-

•**Bisfluoridate**



**Isopropyl  
-Alcohol**

**Letal 50 Dosis:  
0,003 mg/kg**

•**Sarin**

# Medical Identification of OP ( Sarin )

## Cholinergic Hypersecretion Syndrome „SLUDGE“

*caused by Cholinesterase Inhibition*

*in combination with:*

**Eye Symptoms (Miosis, Blurred Vision )      and**

**Bradycardia      or**

**Nerve System ( Seizures, Unconsciousness) or**

**Gastrointestinal Symptoms ( Emesis, Diarrhea )**

**proves that the toxic agent is (>95 % likelihood )  
an Organophosphate**

registration  
triage

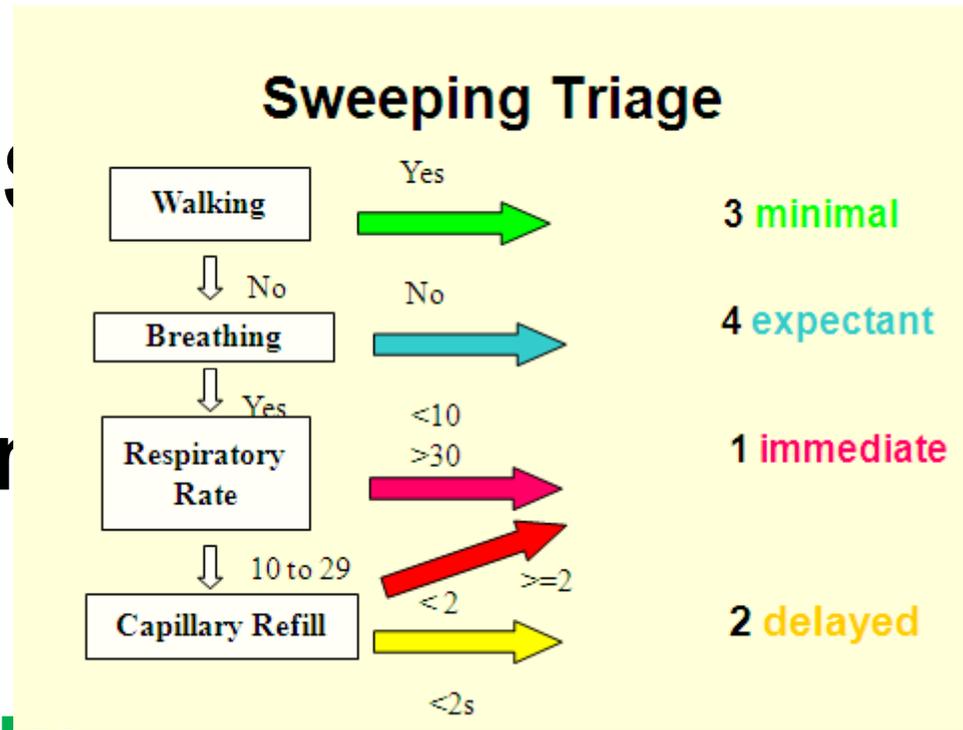


# Autoinjector against OP ( Sarin )

Atropin 5 mg

Obidoxim 50 mg

Diazepam 50 mg



5 mg

50 mg

50 mg

# Sequence of Measures

- **Rescue**
- **Antidot**
- **Registration**
- **Undressing**
- **Triage**
- **Spotdecontamination**
- **Wounddressing**
- **Basic Life Support, Antidot Atropinisation**
- **Decontamination**  
(1´ shower, 2´ soap, 3´ shower)
- **Detection**
- **Retriage, Advanced Life Support, Transport,**
- **Hospital Admission**
- **Definitive Care**

# Triage Group I of Chemical Casualties

## Immediate

### – *Nerve Agent*

- *not walking, not talking, circulation intact*
- *improvement after application of antidot to patients of the expectant treatment group*

### – *Cyanides*

- *Severe distress, circulation intact*

### – *Vesicants*

- *Airway injury, circulation intact,*

### – *Phosgene*

- *Less than 50% of total body surface*

# Triage Group II of Chemical Casualties

## Delayed

- ***Nerve Agent***
  - *Not walking but talking*
  - *Immediate, recovering after antidot application*
- ***Vesicant***
  - *5% - 50% of total body surface, respiration intact*
- ***Cyanides***
  - *Survivors 15 minutes after vapor exposure*

# Triage Group III of Chemical Casualties

## Minimal

- ***Nerve Agent***
  - *Walking and talking*
- ***Vesicant***
  - *1% - 5% of total body surface*

# Triage Group IV of Chemical Casualties

- **Expectant**
  - ***Nerve Agent***
    - not talking, circulation failed
  - ***Cyanides***
    - *circulation failed*
  - ***Vesicants***
    - *over 50% of total body surface, respiration impaired*
  - ***Phosgene***
    - *over 50% of total body surface, respiration impaired*

# Entkleidung (45 sec – 180sec)



# Spot- Decontamination

- **eyes, nose , mouth, face**
  - ( Normal Saline Solution )
- **site of injection**
  - (0.5 Na-Hypochlorite)
- **contaminated areas of the body**
  - (Na-Hypochlorite)
- **wounds**
  - (Hydrogen – Peroxid)

*Rinse 2min, wipe by use of a sponge 2min, rinse 3min*



PATIENT INFORMATION			
NAME	DOB		
John Doe	12/12/1980		
VITALS			
HR	BP	RR	SpO2
72	120/80	18	98
LABORATORY			
TEST	RESULT	REFERENCE	
WBC	12.0	4.0 - 11.0	
HGB	15.0	12.0 - 16.0	
HCT	45.0	37.0 - 47.0	
PLT	250	150 - 400	
PT	12.0	11.0 - 13.0	
PTT	28.0	26.0 - 35.0	
CRP	10.0	0.0 - 3.0	
ESR	20.0	0.0 - 20.0	
Urea	10.0	2.0 - 7.0	
Creatinine	1.0	0.6 - 1.2	
BUN	10.0	7.0 - 20.0	
Glucose	100	70 - 100	
Electrolytes			
Na	135	135 - 145	
K	4.0	3.5 - 5.0	
Ca	10.0	8.5 - 10.5	
Mg	2.0	1.5 - 2.5	
Phosphate	3.0	2.5 - 4.5	
Ammonia	15.0	8.0 - 23.0	
Lactate	2.0	0.5 - 2.0	
Uric Acid	5.0	2.4 - 6.8	
Bilirubin	1.0	0.1 - 1.2	
Albumin	4.0	3.5 - 5.0	
INR	1.0	0.8 - 1.2	
APTT	30.0	28.0 - 35.0	
Fibrinogen	400	200 - 600	
D-Dimer	0.5	0.0 - 0.5	
Prothrombin Time	15.0	13.0 - 16.0	
Partial Thromboplastin Time	30.0	28.0 - 35.0	
Thrombin Time	15.0	13.0 - 16.0	
Fibrin Degradation Products	0.5	0.0 - 0.5	
Coagulation Profile			
PT	12.0	11.0 - 13.0	
PTT	28.0	26.0 - 35.0	
INR	1.0	0.8 - 1.2	
APTT	30.0	28.0 - 35.0	
Fibrinogen	400	200 - 600	
D-Dimer	0.5	0.0 - 0.5	
Prothrombin Time	15.0	13.0 - 16.0	
Partial Thromboplastin Time	30.0	28.0 - 35.0	
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Fibrin Degradation Products	0.5	0.0 - 0.5	
Coagulation Profile			
PT	12.0	11.0 - 13.0	
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INR	1.0	0.8 - 1.2	
APTT	30.0	28.0 - 35.0	
Fibrinogen	400	200 - 600	
D-Dimer	0.5	0.0 - 0.5	
Prothrombin Time	15.0	13.0 - 16.0	
Partial Thromboplastin Time	30.0	28.0 - 35.0	
Thrombin Time	15.0	13.0 - 16.0	
Fibrin Degradation Products	0.5	0.0 - 0.5	





# mobile Dekoneinheit



The most important and most effective decontamination after any chemical or biological exposure is that decontamination done within the first minute or two after the exposure.

This is the personal decontamination.

Early action by the injured to decontaminate himself will make the difference between survival (or minimal injury ) and death (or severe injury ).

Good training can save lives.