

## Adverse health requirements in fire fighters: How often used as start for guidance of occupational physicians in workers' health surveillance?

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## Workers' health surveillance

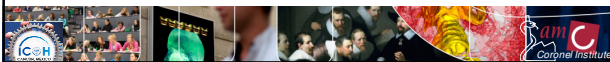
Workers' health surveillance (WHS) includes in the  
Netherlands:

- Monitoring workers' health during career
  - Tasks of the job might affect health
  - Diminished health might affect job performance
- Feedback on results by occupational physician
- Occupational physician can initiate interventions



## Background

- Development job-specific workers' health surveillance (WHS) for fire fighters, including intervention guideline
- Job-specific WHS: important when own and others' health and safety is dependent on performing job well



## Research question

### Two research questions:

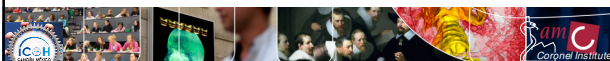
- Which adverse health requirements are signalled with a job-specific WHS in working fire fighters?
- How often are adverse health requirements, found with WHS, the starting point of occupational physicians for interventions for fire fighters?



## Method- I


### Participants

- 3 fire departments in the Netherlands
- 278 fire fighters performed WHS
  - Male (n=232); Female (n=46)
  - Professional (n=147); Volunteer (n=131)
- 5 occupational physicians (OP) involved



## Method- II

### WHS for fire fighters

Psychological aspects	Sense-related & cardiovascular	Physical aspects	Feedback OP
 <ul style="list-style-type: none"> <li>-sleepiness</li> <li>-work-related fatigue</li> <li>-depression</li> <li>-PTSD</li> <li>-anxiety</li> </ul>	 <ul style="list-style-type: none"> <li>-(colour) vision</li> <li>-hearing</li> <li>-skin</li> <li>-BMI</li> <li>-waist circumference</li> <li>-blood pressure</li> <li>-smoking</li> <li>-diabetes</li> </ul>	 <ul style="list-style-type: none"> <li>-airways/lungs</li> <li>-cardio-respiratory</li> <li>-musculoskeletal aspects</li> <li>-carrying capacity</li> </ul>	 <ul style="list-style-type: none"> <li>-consult with guideline by occupational physician for individual fire fighter</li> </ul>



## Content of two job-specific physical tests

### Firefighting simulation test:

- Contains all physical aspects daily consecutive firefighting activities (adapted from Deakin et al. 1998; Plat et al. 2010)
- 12 parts
- e.g. dragging hoses, rescuing dummy, smoke dive simulation in squatting position



### Firefighting stair-climb test:

- Testing energetic peak load within a short time (adapted from Teh and Aziz 2000; Tan et al. 2004; Plat et al. 2010)
- Climbing 20 meters
- Carrying 20 kg of fire fighting-related materials



Both tests: fire fighters wear turn out clothes and self-contained breathing apparatus



## Method- III

### WHS for fire fighters

Psychological aspects



- sleepiness
- work-related fatigue
- depression
- PTSD
- anxiety

Sense-related & cardiovascular



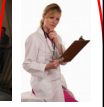
- (colour) vision
- hearing
- skin
- BMI
- waist circumference
- blood pressure
- smoking
- diabetes

Physical aspects



- airways/lungs
- cardio-respiratory
- musculoskeletal aspects
- carrying capacity

Feedback OP



- consult with guideline by occupational physician for individual fire fighter

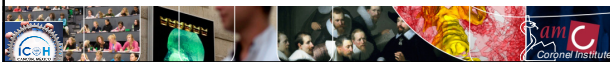


## Method- IV

### Guideline with interventions to be used by OP

#### Procedure

- Consultation individual fire fighter with OP after completion WHS
- Signals of adverse health requirements discussed
- Intervention guideline with evidence-based interventions starting point for interventions/advice
- OP reports initiated interventions
- Start project: OP training in intervention guideline



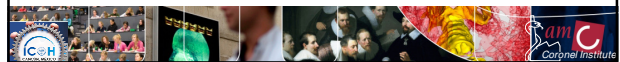
## Method- V

### Guideline for OP

#### Example

Inappropriate physical capacity (not passing physical test):

- Physical training in line with:
  - Aerobic capacity: 30-45 minutes, intensity 60-70% (three times a week)
  - Energetic peak load: training high intensity 80-90% (max. twice a week)
  - Functional for job
- Retest and new appointment are made



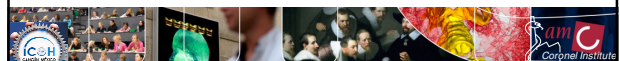
## Results- Adverse health requirements Psychological aspects

Psychological requirements	Prevalence adverse signal %
Sleepiness	<1
Work-related fatigue	2
Depression	7
Post-traumatic stress disorder	4
Anxiety	9



## Results- Adverse health requirements Physical aspects

Physical requirements	Prevalence adverse signal %
Fire-fighting simulation test invalid	25
Fire-fighting stair-climb test invalid	18
Airways/lung complaints after exposure	<1



## Results- Adverse health requirements Sense-related aspects

Sense-related requirements	Prevalence adverse signal %
Vision 0.4 m problem	12
0.6 m problem	8
5 m problem	5
Colour sight problem	5
Hearing problem	3
Skin problem	1



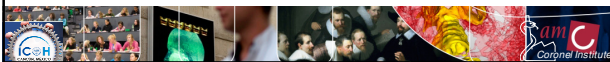
## Results- Adverse health requirements Cardiovascular disease risk factors

Cardiovascular disease risk factors	Prevalence adverse signal %
Body mass index too high	55
Waist circumference too high	15
Systolic hypertension	23
Diastolic hypertension	14
Smokes	22
Diabetes mellitus	1



## Results- starting interventions I signals used as start guidance

Requirements	OP interventions	Adverse health requirement which should have been discussed / Total number of employees	Intervention partly or complete initiated by OP after adverse health requirement	Adverse health requirement not signalled, intervention not initiated
Psychological requirement	76/277 (27%)	59/76 (78%)	17/76 (22%)	
Physical requirement	133/269 (49%)	64/133 (48%)	69/133 (52%)	
Sense-related requirement	55/277 (20%)	29/55 (53%)	26/55 (47%)	
Cardiovascular requirement	198/277 (71%)	154/198 (78%)	44/198 (22%)	



## Results- starting interventions II signals used as start guidance

Requirements	O.P. interventions	Adverse health requirement which should have been discussed / Total number of employees	Intervention partly or complete initiated by OP after adverse health requirement	Adverse health requirement not signalled, intervention not initiated
Psychological requirement	76/277 (27%)	59/76 (78%)	17/76 (22%)	
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## Results- starting interventions III signals used as start guidance

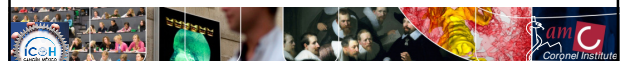
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## Conclusions

### Main conclusion

- Most prevalent adverse health requirements found with WHS were cardiovascular disease risk factors and physical signals
- Adverse health requirements were in more than 65% used as a start of interventions by occupational physicians



## Recommendation and future research

- Training OPs: pay attention to interventions about physical and sense-related requirements
- Researchers should study why OPs don't follow the guideline, and make inventory of OPs' own (evidence-based) interventions to be add to guideline
- Study compliance of fire fighters to interventions advised by OP



Thank you for your attention!

This study was part of my PhD-thesis about  
WHS in fire fighters:  
you are very welcome to receive one!

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