WHEN AND HOW TO ASSESS WORKABILITY AND FOR WHAT PURPOSE?

PERIODICAL EXAMINATIONS

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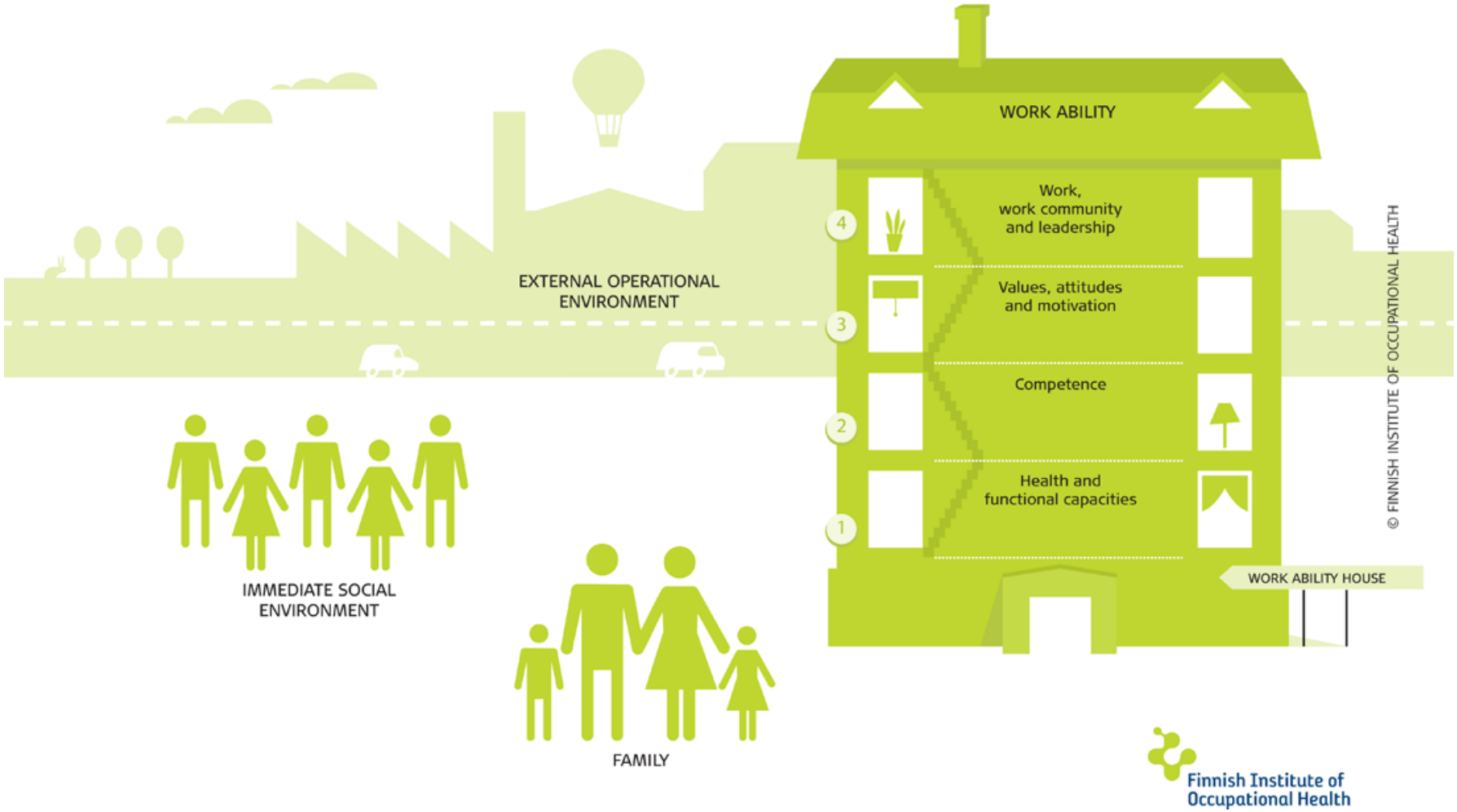
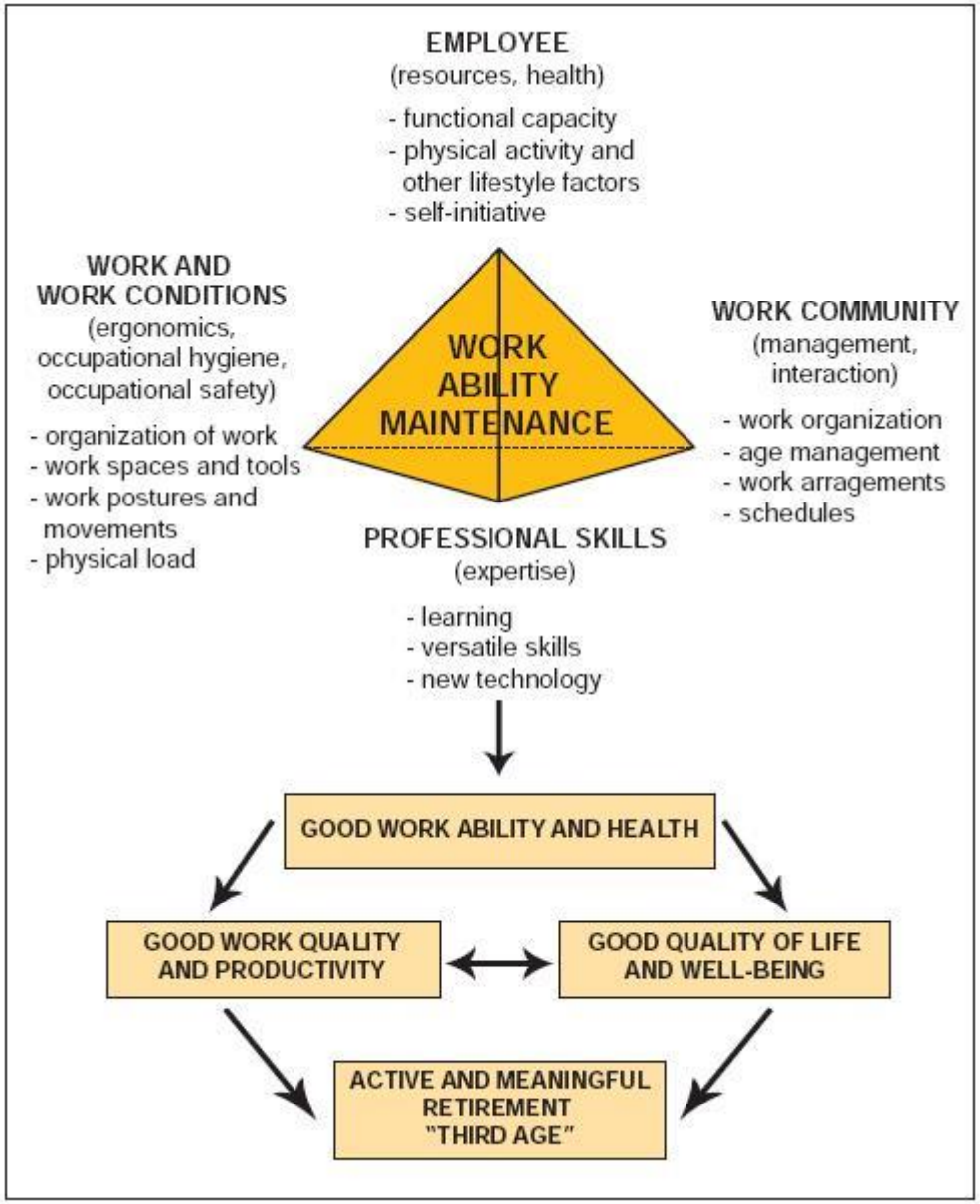
Work Ability House




EMPLOYEE
(resources, health)
- functional capacity
- physical activity and other lifestyle factors
- self-initiative
WORK AND WORK CONDITIONS
(ergonomics, occupational hygiene, occupational safety)
- organization of work
- work spaces and tools
- work postures and movements
- physical load
WORK ABILITY MAINTENANCE
WORK COMMUNITY
(management, interaction)
- work organization
- age management
- work arragements
- schedules
PROFESSIONAL SKILLS
(expertise)
- learning
- versatile skills
- new technology
GOOD WORK ABILITY AND HEALTH
GOOD WORK QUALITY AND PRODUCTIVITY
GOOD QUALITY OF LIFE AND WELL-BEING
ACTIVE AND MEANINGFUL RETIREMENT "THIRD AGE"

FIOSH

Assessment of work ability

- Assessment of work ability of employees is an essential part of
  - occupational health services (OHS)
  - maintenance of work ability
- The assessment begins at the preplacement health examination (?)
- Continues throughout the working career (?)

Ari Kaukiainen, FIOSH

Why and When ?

- When
  - Pre-employment
  - Periodical :
    - early detection of risk of incapacity for work
    - Recognition of possible risk factors in an employee's work, work community or work environment

Assessment of work ability

- Employee : health examination
  - Screening
    - Pre-employment
    - Change of work tasks
    - Periodical / systematic
    - Periodical / reasons to suspect that the work involves a health hazard
  - Diagnosis
    - After period of sick leave / ilness
    - When placing an employee with deficient work capacity to work
- Workplace risk factors
  - Which kind of work
    - stress factors
    - health requirements

Work ability : in case of disease

- Which disease ?
  - limitations
    - set by disease (including substance abusers)
    - in work
  - work performance history
- Traditionally assessed in terms of incapacity for work (fit note)
- Nowadays : in terms of <u>the remaining work ability</u> and suggestions the necessary terms to support it
- When :
  - As often as requested by the employee !
  - Periodicity : according to the limitations & the work environment
- Rehabilitation and reassignment

Work ability and screening in the absence of symptoms or complains

- Goal : early detection of risk of incapacity for work
- Periodical examination : the cornerstone of occupational health ?
- Identifying threats to work ability
- Do we have evidences ?

What is a screening ?

- WHO 1970
- Characteristics
  - Applies to people with no apparent sign of the disease (≠ diagnosis)
  - With a high risk of disease
  - Must differentiate the probably hill from the probably healthy
  - Should lead to a better prognosis and “lighter” treatments
- Differents types of screening:
  - Systematic “mass screenning” : for all
  - Targeted at a specific population, according to their risk factors
  - opportunist : population recrutée pour le dépistage lors d’un recours aux soins (médecine du travail)
- Validity of screening tools ?

WHO 1968 : conditions for screening

- The condition should be an important health problem.
- There should be a treatment for the condition.
- Facilities for diagnosis and treatment should be available.
- There should be a latent stage of the disease.
- There should be a test or examination for the condition.
- The test should be acceptable to the population.
- The natural history of the disease should be adequately understood.
- There should be an agreed policy on whom to treat.
- The total cost of finding a case should be economically balanced in relation to medical expenditure as a whole.
- Case-finding should be a continuous process, not just a "once and for all" project.

Validity of the test ?

what is the chance that a person with a positive test truly has the disease?

what is the chance that a person with a negative test truly does not have the disease?

% of sick people who are correctly identified as having the condition

% of healthy people who are correctly identified as not having the condition

Test result	Disease	Absence of disease
Positive	True positive (A)	False positive (B)
Negative	False negative (C)	True negative (D)

	Disease	Absence of disease
Test result: Positive	True positive (A)	False positive (B)
Test result: Negative	False negative (C)	True negative (D)

Positive predictive value

what is the chance that a person with a positive test truly has the disease?

Negative predictive value

what is the chance that a person with a negative test truly does not have the disease?

Sensitivity

% of sick people who are correctly identified as having the condition

Specificity

% of healthy people who are correctly identified as not having the condition

Test result	Disease	Absence of disease		
Positive	True positive (A)	False positive (B)	Positive predictive value	A / A+B
Negative	False negative (C)	True negative (D)	Negative predictive value	D / C+D

Sensitivity

$$\frac{A}{A+C}$$

Specificity

$$\frac{D}{B+D}$$

	Disease	Absence of disease
Positive	True positive (A)	False positive (B)
Negative	False negative (C)	True negative (D)

Test result

Po
pre

N
pr

Sensitivity

Specificity

Depends on the test

Depends on the prevalence

Impact of prevalence on the PPV

Test characteristics : Se : 82 %
Sp : 92 %

Prevalence	PPV	NPP
50%	91%	91%
25%	74,8%	93,2%
10%	53,8 %	97,7%

Impact of prevalence on the PPV

Test characteristics : Se : 82 %
Sp : 92 %

Prevalence	PPV	NPP
50%	91%	91%
25%	74,8%	93,2%
10%	53,8 %	97,7%

I have 50% chance not to have the disease even if my test is +

SHOULD WE SCREEN EMPLOYEES FOR ANY DISEASES ?

CASIM : causes of unfit for work

- 2009 study by labor inspectors in France

- Main causes of 877 definitive unfit for work
  - MSD : 55%
    - ¼ are work related
  - Mental health disorders: 15%
  - Cancer: 6%

- 91% of them were following a sick leave > 3 months

Therefore …

- Some chronic diseases (diabetes, heart diseases …) can impair work ability
- We have, as OPs, to contribute to their prevention
  - Health promotion
- We may contribute to screening
- Is it evidence based ?

SCREENING FOR DISEASES UNRELATED TO WORK BUT WHICH CAN IMPAIRE WORK ABILITY ?

Interest of a periodical health examination ?

- Proposal for an annual health examination to screen for tuberculosis :
  - 1861 : Horace Dobell, London
  - 1915 : US National Tuberculosis Association
- Still recommanded in the US in the 70ies
- Arising of EBM : proposal to give up
  - 1979 : Canadian task Force on preventive medecine
  - 80ies : US
- However: concerned still 4,4% of consultations in the early 2000 in the US (Chacko, Am J Med 2007)
  - 65% of Americans think it is usefull (Oboler, Ann Int Med, 2002)
  - 65% of physicians also (Prochazka, Arch Int Med 2005)

Cochrane review, 2012, General health checks

- 14 studies included/ 182 880 participants
  - Median follow up : 9 years(22 years for the Stockholm study)
- Interventions : medical examination or questionnaire
  - Only one → several
- Effects investigated :
  - Mortality : total, cancer, cardio-vascular
  - Morbidy : hospitalisation, disability, worry, additional physician visits, or absence from work
- **"did not reduce morbidity or mortality, neither overall nor for cardiovascular or cancer causes"**
  - increased the number of new diagnoses.
- Important harmful outcomes not studied or reported.
- Selection bias ? Healthy ones participate more than sick ones ?

Krogsbøll, BMJ 2012

SOME SCREENINGS ARE RECOMMENDED IN THE GENERAL POPULATION

RISK FACTORS

Screening for alcool abuse

- USPTF Recommandations :
  - Screen for abuse and provide counselling (Grade B)

- Recommendations French Society of Occupational Medicine (2013)
  - It is recommended to ask the employee their consumption of all substances, including medication, on a regular basis. When one abuse is identified, screen for others.

The Binge Drinking exemple

- « Only young are concerns »
- > 5 drinks in one time during the last month

Characteristics	Binge Drinkers, %†				
	1993 (n = 102 464)	1995 (n = 113 934)	1997 (n = 135 582)	1999 (n = 159 989)	2001 (n = 212 510)
All respondents	14.2	12.7	13.2	14.6	14.3
Sex					
Male	21.8	19.9	20.8	22.7	22.2
Female	7.3	6.3	6.3	7.1	7.2
Age, y					
18-20	23.0	19.6	22.0	26.0	26.1
21-25	30.0	26.5	27.4	32.2	32.2
26-34	20.7	19.5	20.2	21.3	21.0
35-54	12.4	11.7	12.5	13.6	13.6
≥55	4.2	3.8	3.9	4.7	4.3

Naimi, JAMA 2003

Consequences of Binge Drinking

- Alcoologie et Addictologie. 2014;36(4):335-373.
- Effects linked to the way people drink
- Effect on
  - Attention
  - Memory
  - Ability to perform complex tasks
- Impairment of work ability

Screening for risk factors

Risk factor	Source	How to screen	grade
Smoking	HAS	Screening for all and councellling	A
HIV	USPSTF	Screeening for 15-65 year-old, and for pregnant women	A
HCV	USPSTF	Screening for high risk populations. Screen people born between 1945 and1965	B

USPSTF: US Preventive Services Task Force
GECSSP: Groupe d'étude Canadien sur les soins de santé Préventifs

Screening for diseases

Disease	Source	How to screen	grade
Obesity	HAS	BMI during all consultation. Abdominal perimeter if BMI > 25	C
	USPSTF	Idem + behaviour councelling if BMI > 30	B
Type 2 diabetes	GECSSP	High risk : HbA1c screening every 3-5 years Very high risk: annual screening	Low
Type 2 diabetes	GECSSP	non recommended if low risk(FINDRISC questionnaire)	High

USPSTF: US Preventive Services Task Force
GECSSP: Groupe d'étude Canadien sur les soins de santé Préventifs

Screening for diseases

Disease	Source	How to screen	Grade
Depression	USPSTF	Screening if the health system allows for an accurate diagnosis, a treatment and a follow-up	B
Depression	GECSSP	Screening not recommended (5 out of 9 DSM4TR criteria)	Low
Suicide	USPSTF	Not enough data to conclude	
Heart diseases	USPSFT	Low risk : ECG de repos ou d'effort not recommended	D
COPD	USPSTF	Spirometry not recommended in asymptomatic individuals.	High Moderate quality evidence
….			

USPSTF: US Preventive Services Task Force
GECSSP: Groupe d'étude Canadien sur les soins de santé Préventifs

Screening for hypertension

US Preventive taskforce 2015

Draft: Recommendation Summary

Population	Recommendation	Grade (What's This?)
Adults age 18 years and older	The USPSTF recommends screening for high blood pressure in adults age 18 years and older. Ambulatory blood pressure monitoring is recommended to confirm high blood pressure before the diagnosis of hypertension, except in cases for which immediate initiation of therapy is necessary.	A

The USPSTF recommends annual screening for

1. adults age 40 years and older
2. Persons at increased risk for high blood pressure :

high-normal blood pressure (130–139/85–89 mm Hg), overweight or obese, or African American.

Adults ages 18 to 39 years with normal blood pressure (<130/85 mm Hg) who do not have other risk factors should be rescreened **every 3 to 5 years**.

The USPSTF recommends rescreening with properly performed office blood pressure measurement, and if blood pressure measurements are elevated, confirming the diagnosis of hypertension with ambulatory blood pressure monitoring.

Screening for cancer: recommended

- Breast cancer
  - France (2004): Mammography + clinical exam/2ans 50 - 74 years
  - GECSSP : Mammography /2ans 50 - 74 years
  - USPSTF : Mammography after 50 (Grade C)
- Cervical cancer
  - GECSSP : pap test every 3 years, from25 to 69 years old (High Level)
  - USPSTF : pap test every 3 years, from21 to 65 years old (Grade A)
- Colorectal cancer USPSTF :
  - Individual risk assessment recommended
    - Screening between 50 and 77 year-old
      - Start at 40 if risk factors
    - Fecal Occult Blood Test, sigmoidoscopy or colonoscopy
  - France : Fecal Occult Blood Test/2 years, between 50 and 74

Screening for cancer: negative recommendations

- Breast cancer: not recommended USPSTF & GECSSP
  - From 40 to 49,
  - No MRI, no self exam
- Cervical cancer
  - GECSSP : no screening before 25
  - USPSTF : no screening before 25
- Prostate cancer
  - USPSTF (2012) : No PSA measurement in the general population
  - USPSTF (2013) : PSA measurement not recommended for people who did chez les sujets ne l'ayant pas clairement demandé
    - non recommandé avant 50 ans, >69ans et espérance de vie <10 ans

Limits of these recommendations

- Based on evidences … and concensus
- So... sometimes discrepent (Gelly, Prev Med 2013;57:3-11)
- Comparison of 166 preventive services recommendations
  - F, Ca & US
- Agreement
  - Strong agreement : 26%
  - Intermediate agreement 49%
  - Strong diagreement : 25%
- Multivariate analysis
  - Strong agreement for history taking & physical examination
  - Disagreement on the intervention
    - Age & sex of the population
    - Periodicity

Table 3
Level of agreement between the Canadian, French and US targeted recommendations included up to November 3rd, 2011.

	Number of targeted recommendations					
	Comparison between at least two countries					No possible comparison (n)
	N	Strong agreement	Intermediate agreement	Major disagreement	Fisher's exact test (*p*)	
Overall level of agreement						
	166	43 (26%)	82 (49%)	41 (25%)		84
Clinical category					0.10	
Cancers	64	13 (20%)	[illegible]	20 (31%)		25
Cardio vascular diseases	30	7 (23%)	13 (43%)	10 (33%)		15
Infectious diseases	23	6 (26%)	14 (61%)	3 (13%)		9
Injury/mental health/musc. dis.	23	12 (52%)	9 (39%)	2 (9%)		15
Metab., nutritional, and endocrine cond.	21	4 (19%)	12 (57%)	5 (24%)		13
Miscellaneous	5	1 (20%)	3 (60%)	1 (20%)		17
Sequence of steps of the medical consultation					0.01	
History-taking and physical examination	19	10 (53%)	6 (32%)	3 (16%)		14
Counseling	37	12 (32%)	23 (62%)	2 (5%)		29
Techniques and procedures	98	20 (20%)	47 (48%)	31 (32%)		34
Intervention	12	1 (8%)	6 (50%)	5 (42%)		7
Gender of the target population					0.04	
Only for men	30	5 (17%)	18 (60%)	7 (23%)		10
Only for women	52	9 (17%)	26 (50%)	17 (33%)		21
For both gender	84	29 (35%)	38 (45%)	[illegible]		53
Age of the target population					0.08	
Individuals over 50	48	7 (15%)	22 (46%)	19 (40%)		11
Individuals under 50	21	5 (24%)	11 (52%)	5 (24%)		5
Different age limits	97	31 (32%)	49 (51%)	17 (18%)		68
Risk level for disease occurrence					0.009	
General population	120	24 (20%)	62 (52%)	34 (28%)		66
High-risk population	46	19 (41%)	20 (43%)	7 (15%)		18
Maximum time range between recommendations' publication					0.24	
Less than 5 years	43	16 (37%)	18 (42%)	9 (21%)		84
5 to 9 years	41	8 (20%)	19 (46%)	14 (34%)		
10 to 14 years	52	11 (21%)	29 (56%)	12 (23%)		
15 years or more	30	8 (27%)	16 (53%)	6 (20%)		
Proposal for clinical practice					<0.001	
To be implemented	78	25 (32%)	45 (58%)	8 (10%)		37
Indeterminate about implementation	34	16 (47%)	6 (18%)	12 (35%)		28
Not to be implemented	54	2 (4%)	31 (57%)	21 (39%)		19

Values are number and (%). Injury/Mental health/Musc. dis.: Injury, Mental health, and Musculoskeletal disorders; Metab., nutritional, and endocrine cond.: Metabolic, nutritional, and endocrine conditions. p: Fisher's exact test performed on strong agreement (vs. intermediate agreement or major disagreement).

Conclusion on general screening

- General health checks in adults : no interest in public health
  - So no interest in occupational health, appart from specific risk factors ?
  - Does it bring trust in the physician/patient relationship ?
  - A way to deliver preventive messages ?

- Some specific screenings should be performed
  - More targeted on risk factors
  - Which periodicity ?
  - Sometimes « one shot »

What is our mission as OP ?

- Perform those public health screenings ?
  - Why not … Its helps maintain work-ability
  - Do we have time?
- Be sure they are done !
  - Send to GPs ?
- Save time for health promotion ?
  - Is health promotion on the workplace efficient ?
  - Yes, but
    - If you identify the right target (Saltychev, Scand J Work Environ Health 2012)
    - The cost is high (van Dongen, Scand J Work Environ Health 2012)
    - The effects are usually moderate (Rongen, Am J Prev Med 2013)

SCREENING FOR OCCUPATIONAL DISEASES, WHICH CAN IMPAIRE WORK ABILITY ?

An old question…

Brit. J. industr. Med., 1951, **8**, 53.

THE ROLE OF PERIODIC EXAMINATION IN THE PREVENTION OF COALWORKERS' PNEUMOCONIOSIS

BY

A. L. COCHRANE, C. M. FLETCHER, J. C. GILSON, and P. HUGH-JONES

From the Pneumoconiosis Research Unit of the Medical Research Council, Llandough Hospital, Nr. Cardiff

There can be no doubt that coalworkers' pneumoconiosis presents one of the most serious problems in industrial medicine in Britain, at least in respect of the numbers of men affected. From 1931 up to

are really no more than a provisional target for engineers engaged on dust suppression.

Since the complete suppression of all airborne dust in the mines is impracticable and safe

Occupational rhinitis

- Recommendations SFMT 2011 (Ameille & Coll.)
- For what / whom ?
  - Flour, hairdressing products, latex, dust mites, aldehydes, quaternary ammoniums , wood dust, amines isocyanates …
  - Bakers, heirdressers, health professionnals & cleaners : 72% of cases
- How?
  - During training and the first two years of practice
  - Asking for intermittent or persistent symptoms of :
    - nasal congestion, sneezing, rhinorrea, itching
  - Which improve during WE and hollidays

Wood dust

- Recommendations SFMT 2011 : nasal cavity and paranasal sinus cancer

- Not recommended : X rays, MRI, CTscan

- Recommended
  - For whom ?
    - > 30 years after the first exposure
    - For exposures
      - > 12 months
      - > 1 mg/m^3/day
  - How ?
    - Nasal endoscopy + search for symptoms every 2 years

Screening for occupational asthma

- Recommendation of the ERS Task Force on the Management of Work-related Asthma (Wilken, Eur Respir Rev 2012)
  - Literature review : 72 articles retenus
- Screen from the first exposure

Recommendations	Strength of recommendation	Level of evidence
Questionnaire-based identification of all workers at risk of developing work-related asthma is recommended as basis for surveillance	Strong	High
Pre-placement screening for specific cross-reacting, work-associated sensitisation among potentially HMW allergen-exposed subjects is recommended in order to identify those at higher risk for work-related asthma	Strong	Moderate
Detection of sensitisation either by specific IgE or SPT should be included in surveillance (not only pre-placement) for identification of subjects at risk of work-related asthma with foreseeable regular exposure to HMW agents (such as laboratory animals, bakery dust, enzymes or latex)	Strong	Moderate
In atopics and subjects with pre-existing asthma or sensitisation, pre-employment investigation should be performed in order to inform them about their increased work-related asthma risk	Weak	Moderate
Because of the low PPV, exclusion of asymptomatic atopics or sensitised subjects from exposure to potential occupational allergens or irritant agents cannot be recommended		
In all workers with confirmed occupational rhinitis and/or NSBHR, medical surveillance programmes should be performed		
They should include periodic administration of a questionnaire, detection of sensitisation by standardised SPT or serum specific IgE antibodies, early referral of symptomatic and/or sensitised subjects for specialised medical assessment and assessment of asthma	Strong	Moderate
Surveillance programmes should already be implemented during vocational training of individuals at risk		
Identification of symptoms or sensitisation during surveillance should result in an investigation to confirm or exclude occupational asthma, work-related asthma, rhinitis and COPD	Strong	High
Risk stratification by diagnostic models can be used in medical surveillance to select exposed workers for further medical evaluation	Strong	Moderate
As a secondary prevention measure, a comprehensive medical surveillance programme should, in addition to early detection of sensitisation, allergic symptoms and occupational asthma, comprise exposure assessment and intervention targeted both at workers and exposure	Strong	Moderate

HMW: high molecular weight; Ig: immunoglobulin; SPT: skin-prick test; PPV: positive predictive value; NSBHR: nonspecific bronchial hyperresponsiveness; COPD: chronic obstructive pulmonary disease.

Diseases made worse by work ?

- Screening for breast cancer

- Shift work = risk factor (IARC 2A)
  - So women > 50 + shift work : screening ++

- But(Tsai, Am J Ind Med 2013)
  - US National Health Interview Survey
  - Women who perform shift work participate less to breast cancer screening than those in day shift
  - 23% vs 34% ($p<0,05$)

Diseases of multiple origine, with higher frequency at work

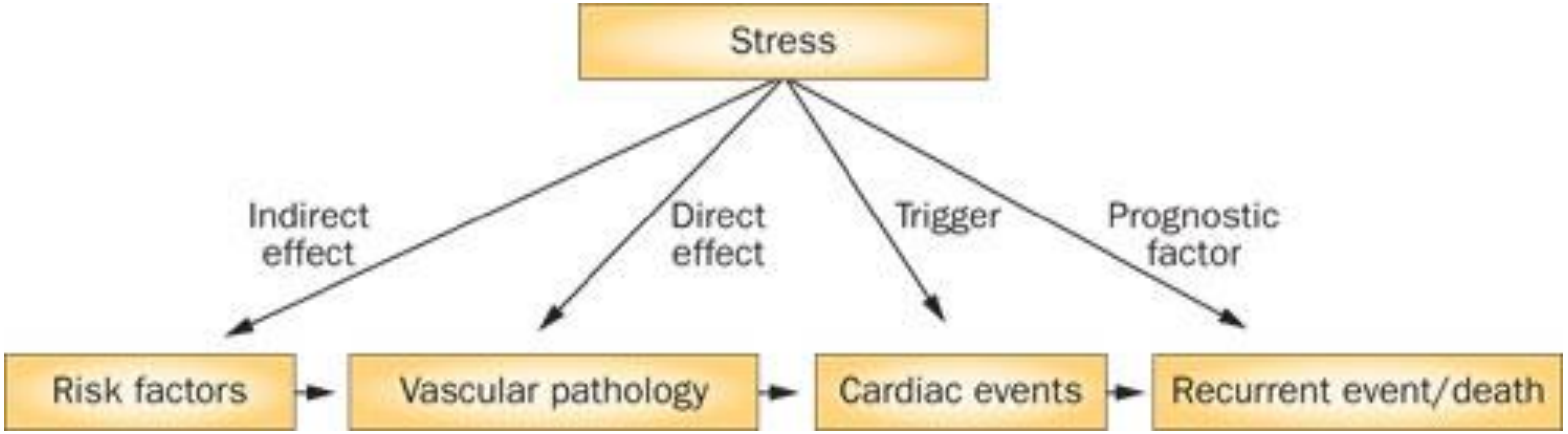
- Truck drivers: litterature review, 32 studies(Abu Dabrh, BMJ Open 2014)
  - 78,4% overweight & 45,2% obesity
  - 23% hypertension , 19% sleep disorders
- Comparing to general population (Sieber, Am J Ind Med 2014)
  - 1670 american truck drivers
  - obesity: 69% vs 31% (p<0,01)
  - Active smoking: 51% vs 19% (p<0,01)

- Screening is even more indicated than in the general population
  - Also for security reasons

OFTEN HARD TO DISANTANGLE

WORK RELATED AND NON WORK RELATED DISEASES

EX: STRESS

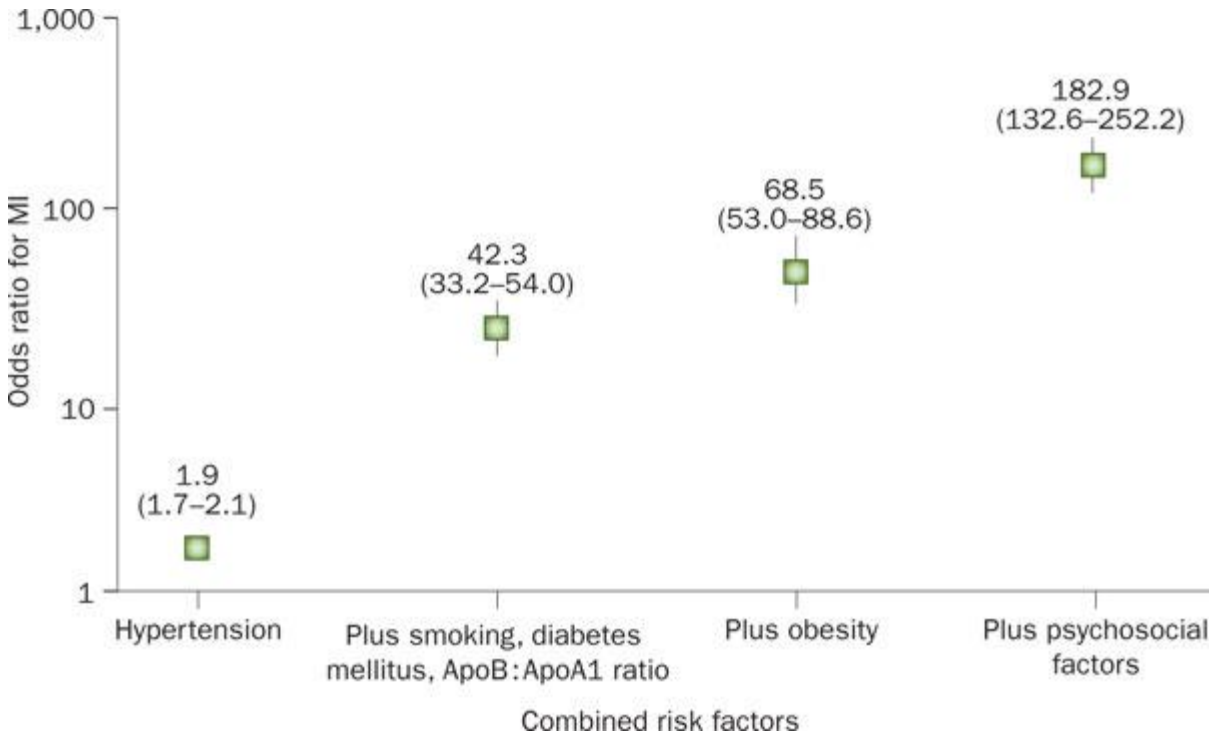


Steptoe, A. & Kivimäki, M. (2012) Stress and cardiovascular disease
Nat. Rev. Cardiol. doi:10.1038/nrcardio.2012.45

Stress & CVRF

- Finnish Public Sector study (Kouvonen, J Epidemiol Community Health 2005)
  - >50,000 participants,
  - Smokers : stressed at work vs not stressed
  - 50% more risk to smoke more than 20 cig/day
- Copenhagen City Heart Study (Rod, J Intern Med 2009)
  - High stress vs low
  - Fewer quit smoking and drinking
  - More sedentarity
- Working > 11h/j linked to
  - Shorter sleep & sleep disorders (Virtanen, Sleep 2009)
  - Risk factors for cardiovascular diseases
  - Especially if associated (Chandola, Sleep 2010)

Figure 3 Risk of acute MI associated with exposure to multiple risk factors among 29,972 individuals across 52 countries in the INTERHEART study



The 95% CIs are shown in brackets.
Abbreviations: Apo, apolipoprotein; MI, myocardial infarction.

Steptoe, A. & Kivimäki, M. (2012) Stress and cardiovascular disease
Nat. Rev. Cardiol. doi:10.1038/nrcardio.2012.45

Occupational stress & CVD

- Many systematic reviews
  - Results varies

- Meta-analysis 2006 (Kivimäki, Scand J Work Environ Health 2006)
  - Employees exposed to stress on their workplace vs employees not exposed
  - Risk for CVD : +50%

- Meta-analysis (Kivimaki, Lancet 2012)
  - Job strain vs no job strain
  - Coronary heart disease
  - RR : 1,23 (95% CI 1,10–1,37)

Job strain as a risk factor for coronary heart disease: a collaborative meta-analysis of individual participant data

Mika Kivimäki, Solja T Nyberg, G David Batty, Eleonor I Fransson, Katriina Heikkilä, Lars Alfredsson, Jakob B Bjorner, Marianne Borritz, Hermann Burr, Annalisa Casini, Els Clays, Dirk De Bacquer, Nico Dragano, Jane E Ferrie, Goedele A Geuskens, Marcel Goldberg, Mark Hamer, Wendela E Hooftman, Irene L Houtman, Matti Joensuu, Markus Jokela, France Kittel, Anders Knutsson, Markku Koskenvuo, Aki Koskinen, Anne Kouvonen, Meena Kumari, Ida E H Madsen, Michael G Marmot, Martin L Nielsen, Maria Nordin, Tuula Oksanen, Jaana Pentti, Reiner Rugulies, Paula Salo, Johannes Siegrist, Archana Singh-Manoux, Sakari B Suominen, Ari Väänänen, Jussi Vahtera, Marianna Virtanen, Peter J M Westerholm, Hugo Westerlund, Marie Zins, Andrew Steptoe, Töres Theorell, for the IPD-Work Consortium

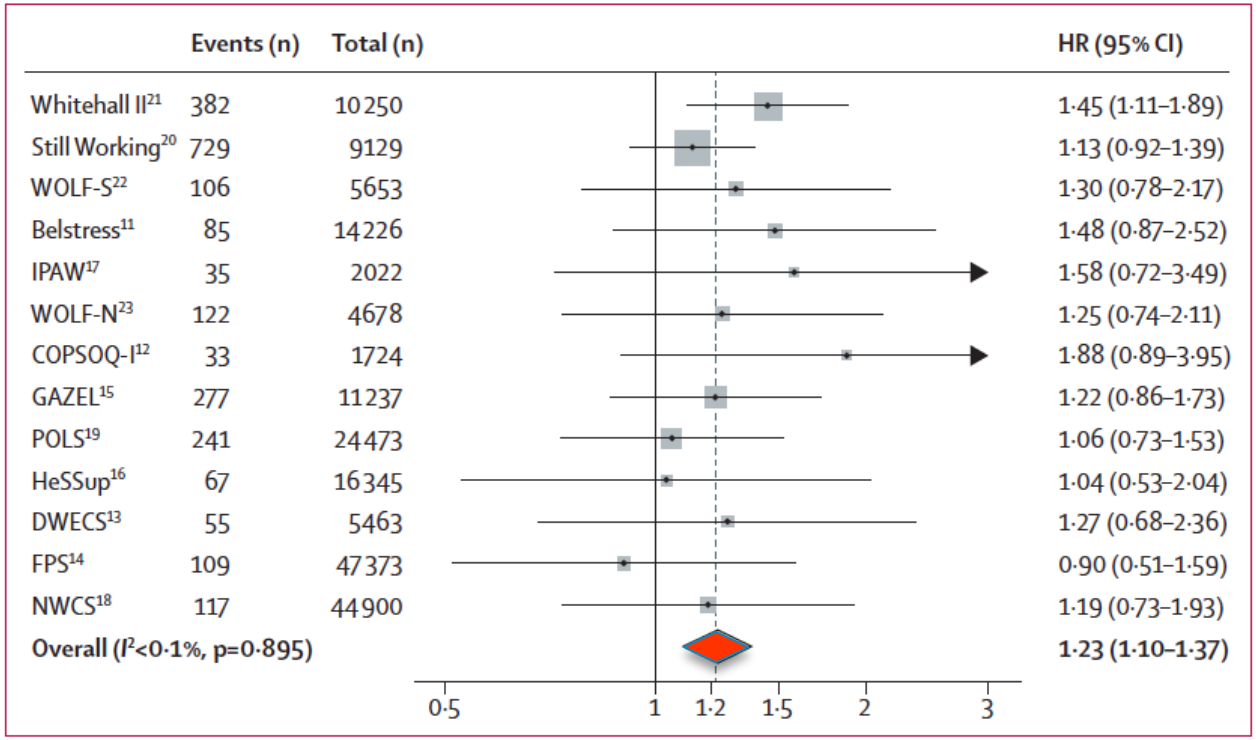
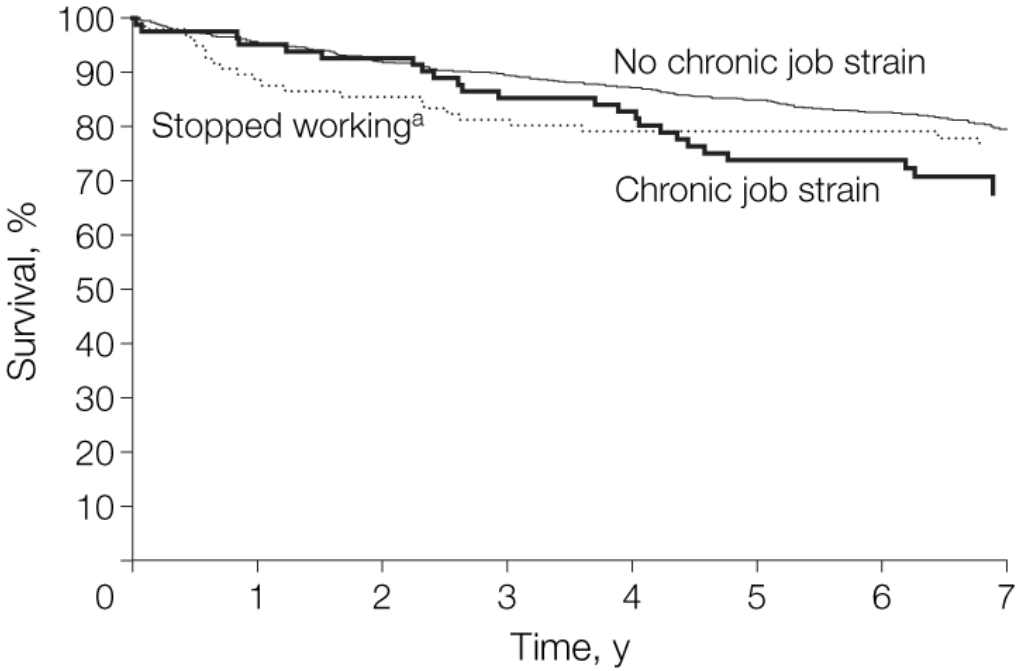


Figure 1: Random-effects meta-analysis of the association between job strain and incident coronary heart disease

Lancet 2012; 380: 1491–97

Modèle de Karasek

Job strain recurrent coronary heart disease



No. at Risk								
No chronic job strain	750	717	688	664	645	622	597	261
Chronic job strain	82	78	76	70	67	58	56	19
Stopped working[a]	97	86	83	77	74	71	69	36

Chronic job strain was associated with a significantly increased risk of recurrent coronary heart disease events from 2.2 years of follow-up and beyond among middle-aged patients who returned to work after a first MI. These results were obtained after full adjustment for 26 CHD-risk factors and sociodemographics, lifestyle, and clinical-prognostic and work-environment characteristics

Aboa-Eboulé, *JAMA.* 2007;298(14):1652-1660.

SCREENING FOR DISEASES DANGEROUS FOR OTHER WORKERS

Chest X rays for tuberculosis

- "La radiographie de thorax annuelle est elle toujours justifiée en médecine du travail ? "
  - Ameille J, Cariou R, Leclerc P, Constans P, Dufat R, Proteau J, Rochemaure J. Nouv Presse Med. 1982 Sep 4;11(34):2539-42

- Many studies …

Pre-employment chest-X rays

Where	When	Nb of subjects	Nb of TB identified	Réf.
Newcastle	1988	1000	1	Jachuck 1988
Boston	2003-2007	2586 with TST > 10 mm	0	Eisenberg 2010
Essen	2006	1760	0	Ladd 2006
……				

Outside of hospital, high incidence countries

Where	When	Nb of subjects	Nb of TB identified	Réf.
Abidjan	2004-2009	2540	45 TB (2%)	Kouamé 2012
Taiwan	2004-2005	17 105	7 TB (0,04%)	Su, 2007

So : useless, unless the HCW is coming from a high incidence country

WHICH TOOLS ?

Se / Sp of physical examination

- Sometimes very limited

- Carpal tunnel syndrome (Dale, Am J Ind Med 2011)
  - 1108 pre-employment screening
  - Clinical signs vs Nerve conduction velocity
  - Good specificity but sensitivity not > 20%

- Comparison exam by a neurologist vs quantitative tests for : (Steenland, Am J Ind Med, 2001)
  - arm tremor, postural sway, and vibrotactile sensitivity (finger and toe)
  - Tests can be used for screening

Use of questionnaires

- Screening for CTS in epidemiological studies (d'Escatha, OEM 2010)
  - Gold standard : Nerve conduction velocity
  - Questionnaire better than physical examination

- Follow-up of animal workers(Allan Occ Med 2010)
  - « spirometry does not detect new cases other than those already identified by questionnaire »

Use of questionnaires

- Applicability of a symptom-based questionnaire on hand dermatitis was assessed in a population of rubber workers (Vermeulen, Contact Derm 2000)
  - medical evaluation as 'gold standard'
  - Se = 71,4%, Sp = 76,1% : insuffisant ?
  - VPP = 18,2%
  - VPN 97,3%

- noise-induced hearing loss: questionnaire < audiometry (Rosso, Occ Med 2011)
  - 250 workers in Malta
  - Se: 32 %, Sp: 79% => unacceptable

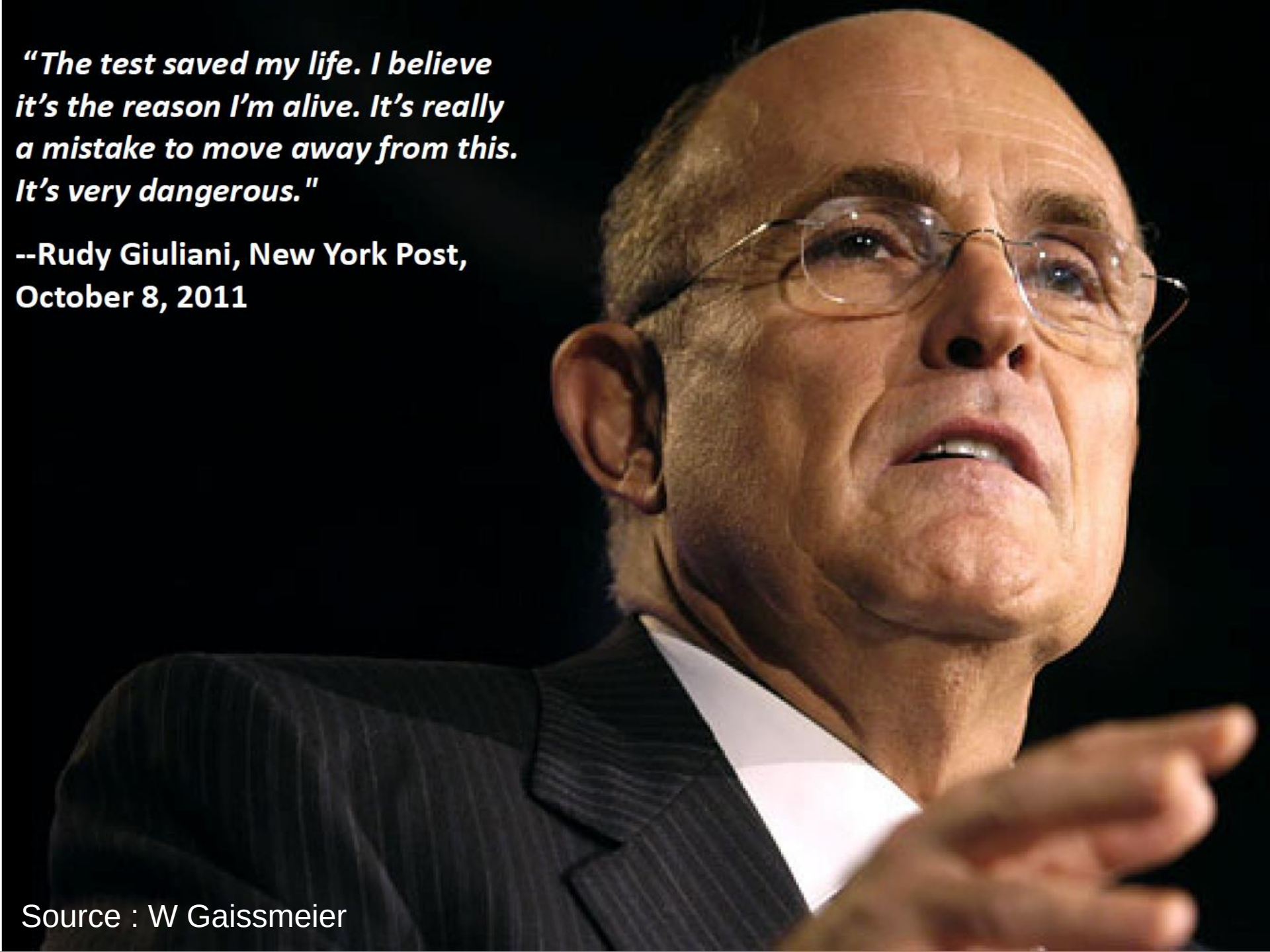
So

- If a screening is waranted…
- Use of questionnaires is sometimes enough
  - Questionnaire specific
  - Personnel trained (occupational health nurses ?)
  - Favour sensitivity instead of specificity
- The screening strategy must be defined according to the risks and the diseases we target

ETHICAL ASPECTS

Limitations of screening

- Screening can involve cost and use of medical resources on a majority of people who do not need treatment.
- Adverse effects of screening procedure (e.g. stress and anxiety, discomfort, radiation exposure, chemical exposure).
- Stress and anxiety caused by a false positive screening result.
- Unnecessary investigation and treatment of false positive results.
- Stress and anxiety caused by prolonging knowledge of an illness without any improvement in outcome.
- A false sense of security caused by false negatives, which may delay final diagnosis


"The test saved my life. I believe it's the reason I'm alive. It's really a mistake to move away from this. It's very dangerous."
--Rudy Giuliani, New York Post, October 8, 2011
Source : W Gaissmeier

Prostate cancer

44 « real » cancers for 1000 people

Screening	1000 men without screening
Benefit	
Nb who die from prostate cancer	8
Nb who die from other cause	200
Harm	
Nb diagnosed and treated without benefit	0
False positive and biopsy	0

Djulbegovic, BMJ 2010

Prostate cancer

44 « real » cancers for 1000 people

Screening	1000 men without screening	1000 men screened (IC 95%)
Benefit		
Nb who die from prostate cancer	8	7 (6-9)
Nb who die from other cause	200	198 (194-202)
Harm		
Nb diagnosed and treated without benefit	0	20
False positive and biopsy	0	180

Djulbegovic, BMJ 2010

Screening for lung cancer

- NLST (National Lung Screening Trial)
- Population : 50 000 people
  - Smokers or former smokers (> 20 cig/day for 30 years)
  - 55 - 74 years old
- Low dose Computed Tomographic screening
  - 1/year for 3 years
- Se: 94%, Sp73%
- False positives:
  - noncalcified nodules with long-axis diameters of 4 mm or greater in the axial plane were considered to be positive for potential lung cancer.
  - 96% of false positives

Aberle et al. NEJM 2011;365:395-409

NLST

- Benefits : significant reduction of
  - 20 % mortality by lung cancer
  - 6,7 % total mortallity
- Harms :
  - Irradiation → cancer risk ?
  - False positives → investigations → morbidity
    - 290 biopsy procedure
      - 6 death

Aberle et al. NEJM 2011;365:395-409

The NEW ENGLAND JOURNAL of MEDICINE

Perspective

MAY 22, 2014

Abolishing Mammography Screening Programs? A View from the Swiss Medical Board

Nikola Biller-Andorno, M.D., Ph.D., and Peter Jüni, M.D.

« We were struck by how nonobvious it was that the benefits of mammography screening outweighed the harms. »

Can we identify susceptible individuals

- "Scientific evidence for increased susceptibility often is weak and rarely satisfies legal thresholds for sufficient risk to warrant exclusion from a particular job" (Mohr, Occup Med. 1999)

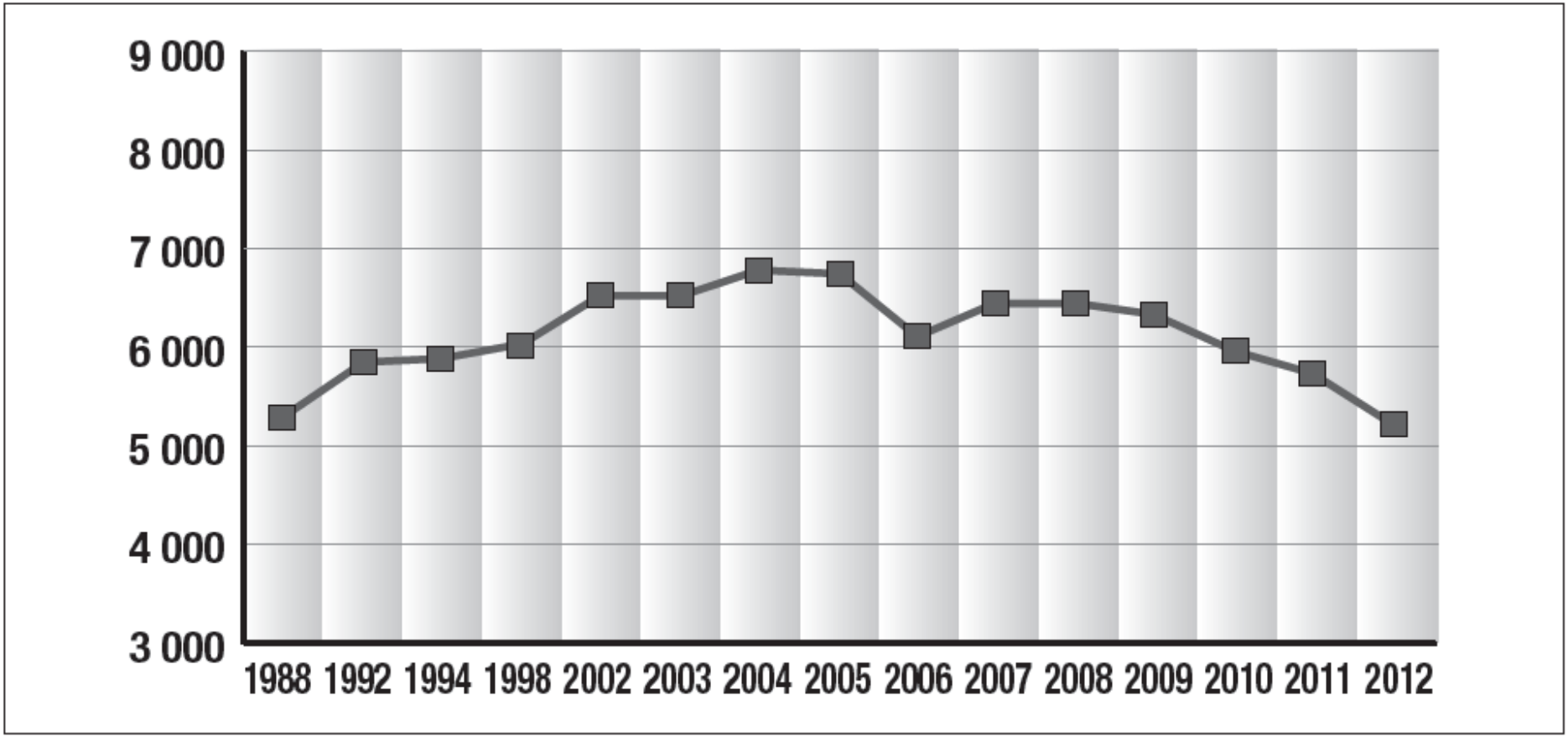
- PPV of atopy markers -> occupational asthma or rhinitis: low*
  - Rejection is not justified.
  - Information to reduce exposures

* : Walusiak , 2002; Platts-Mills, 1987; Bardy, 1987; Malo, 1990

A situation to take into account?

Évolution des effectifs de médecins du travail

(total en ETP au 1er janvier de chaque année)

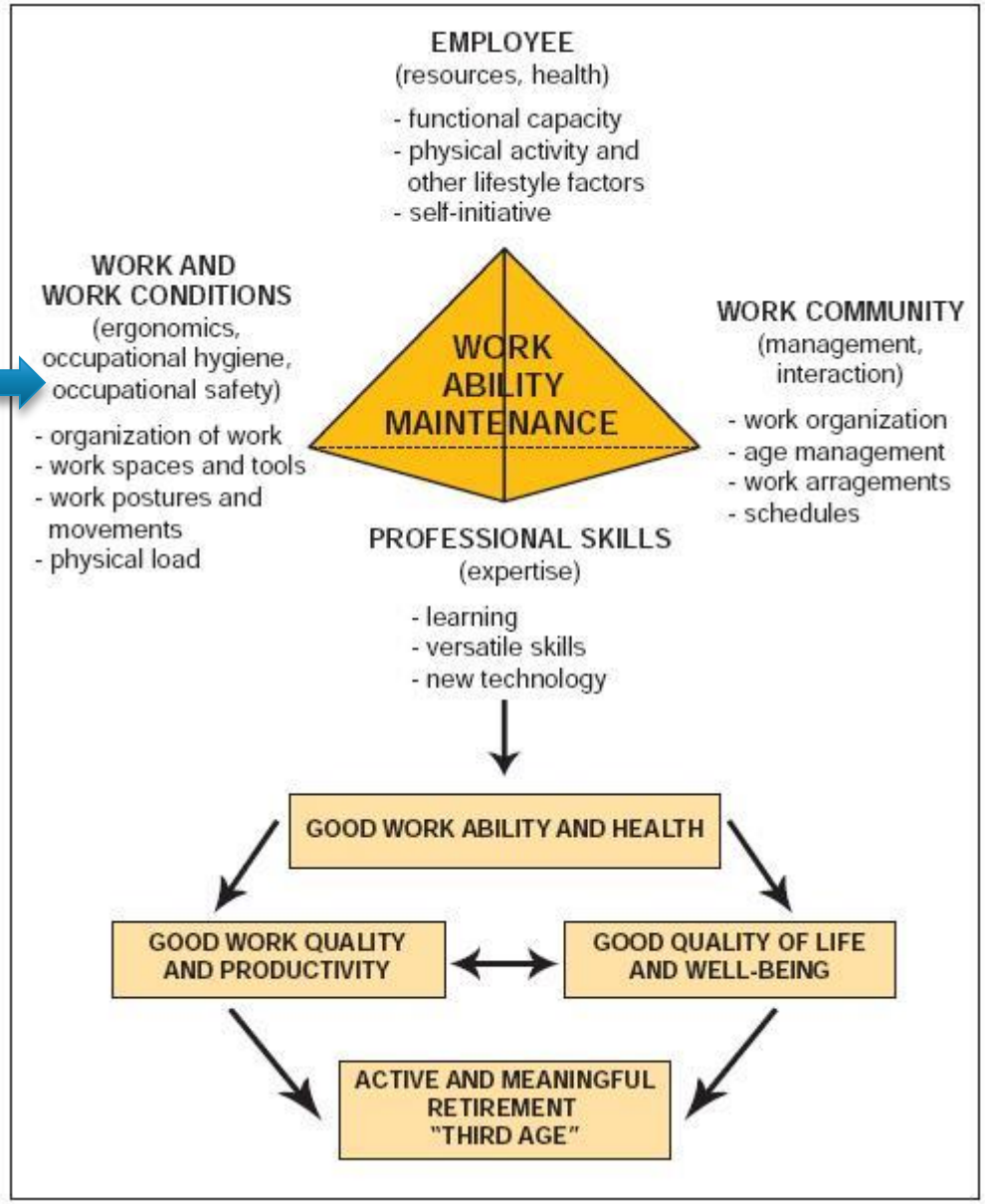


Source : COCT bilan 2012

Conclusion from an the ethical point of view

- Primum non nocere
- Consider the benefits AND the harms of screening
- Beware of the risk of exclusion
- Context of shortage of OPs

Can we assess working conditions during medical examination ?



FIOSH

Brit. J. industr. Med., 1951, **8**, 53.

THE ROLE OF PERIODIC EXAMINATION IN THE PREVENTION OF COALWORKERS' PNEUMOCONIOSIS

BY

A. L. COCHRANE, C. M. FLETCHER, J. C. GILSON, and P. HUGH-JONES

From the Pneumoconiosis Research Unit of the Medical Research Council, Llandough Hospital, Nr. Cardiff

« The periodic examination would provide a means of defining safe dust levels in different mines leading to control of the disease by economical dust suppression, meanwhile giving protection to new entrants and to workers not already affected. »

Can workers assess their own exposure ?

- Few studies, within epidemiological studies
- Etudiés dans le cadre des études épidémiologiques
  - Literature review(Teschke, Occup Environ Med, 2002)
  - Very different results from one study to another
  - «the assessment by an expert stay the best method »
    - Specificity> 90%
  - In rare cases, self assessment > job exposure matrix

  - Validity of self assessment depends on
    - The person and its involvement
    - Whether or not the exposure can be perceived

Validity of self-assessment: physical risk factors

- MSD risk factors (Mortimer, Appl Ergon 1999;30(6):477-86)
  - Time spent sitted, standing hand above shoulders, at trunc level or below waist
  - 20 persons: observation vs questionnaire
  - Good agreement
- Job constraints (Hjelm, J Occup Environ Med 1995;37(10):1210-7)
  - 39 men, 58 women
  - Ratings of physical exertion & physical activity at the end of a work shift vs average heart rate during the same work shift
  - Significant correlation for men ($p<0,01$)
  - No relation for women
- Noise exposure (Neitzel, J Occup Environ Hygiene, 8: 310–323)
  - Perceived vs measurement
  - Poor agreement

Validity of questionnaire self-reports on computer, mouse and keyboard usage during a four-week period

Sigurd Mikkelsen, Imogen Vilstrup, Christina Funch Lassen, Ann Isabel Kryger, Jane Frølund Thomsen, Johan Hviid Andersen

Occup Environ Med 2007;**64**:541–547. doi: 10.1136/oem.2005.026351

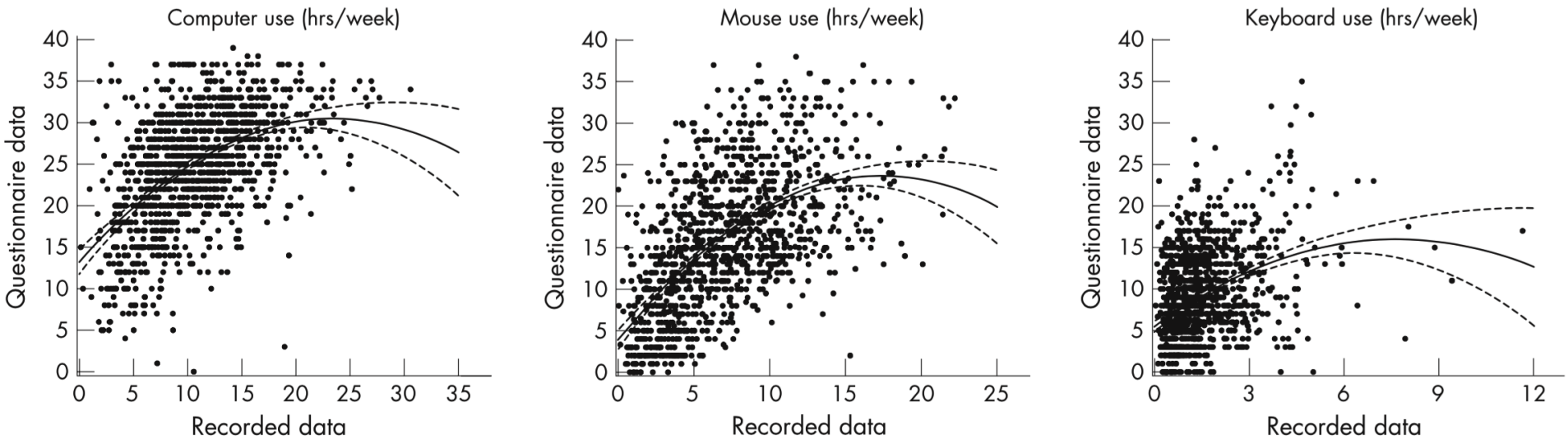


Figure 1 Scatter plots of questionnaire data versus objectively recorded data on computer, mouse and keyboard usage (hours per week) during the same four-week period (n = 1211). The lines are regression lines with 95% confidence intervals (y = bx + bx2).

Software-recorded and self-reported duration of computer use in relation to the onset of severe arm—wrist—hand pain and neck—shoulder pain

Stefan IJmker,[1,2,3] Maaike A Huysmans,[1,2] Allard J van der Beek,[1,2] Dirk L Knol,[4] Willem van Mechelen,[1,2] Paulien M Bongers,[1,2,3] Birgitte M Blatter[1,3]

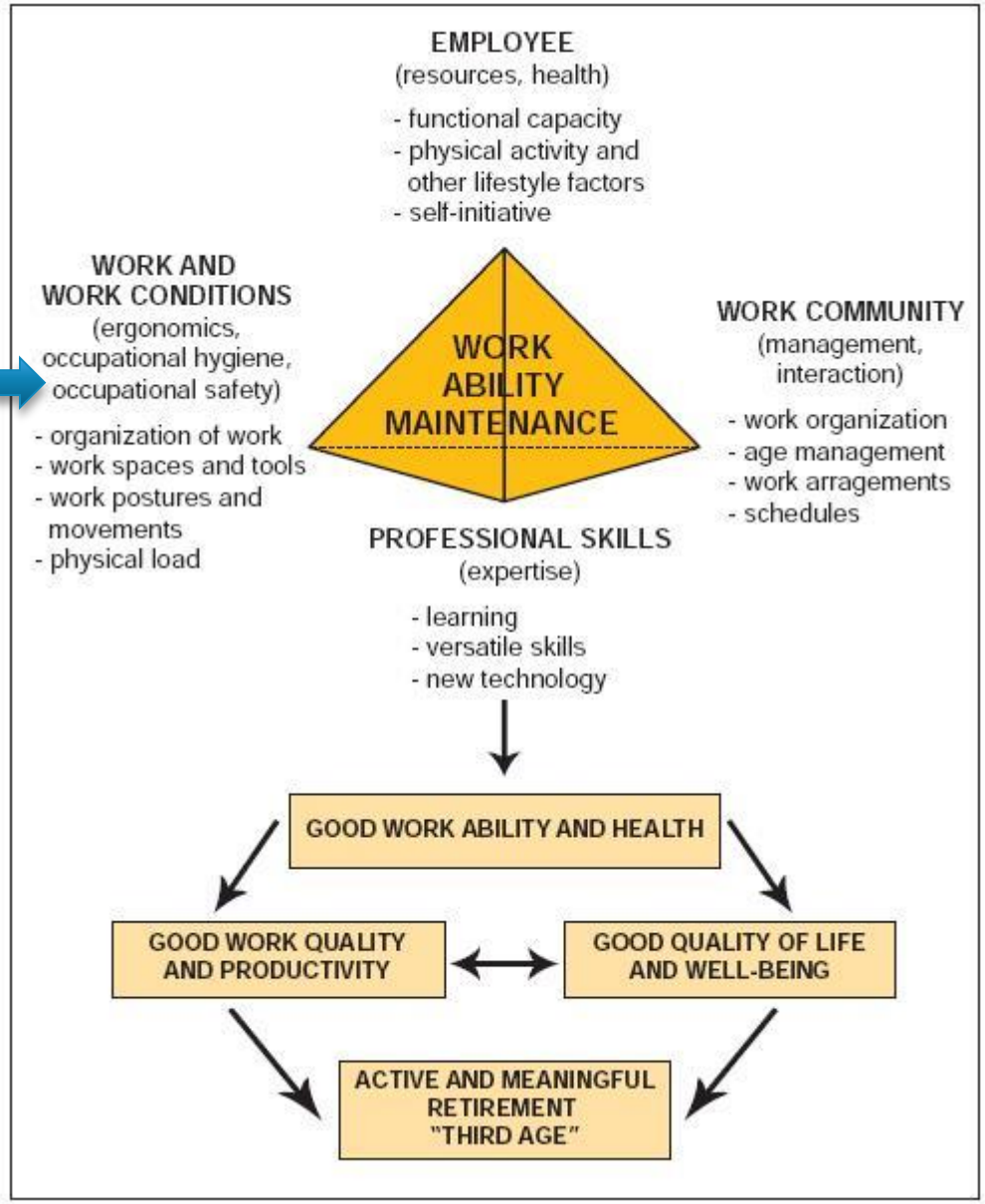
No association was found between the software-recorded duration of computer use at work and the onset of severe arm-wrist-hand and neck-shoulder symptoms using an exposure window of 3 months. In contrast, a positive association was found between the self-reported duration of computer use at work and the onset of severe arm-wrist-hand and neck-shoulder symptoms. The different findings for recorded and self-reported computer duration could not be explained satisfactorily.

Table 5 Univariate and multivariate associations between self-reported and recorded duration of computer use at work and arm—wrist—hand and neck—shoulder cases

	Arm—wrist—hand		Neck—shoulder	
Exposure variable	**Univariate RR (95% CI)**	**Multivariate* RR (95% CI)**	**Univariate RR (95% CI)**	**Multivariate† RR (95% CI)**
Self-reported duration of total computer use at work, h/day				
0 to <4	1	1	1	1
4 to <6	1.4 (0.9 to 2.2)	1.9 (1.1 to 3.1)	1.3 (0.9 to 1.7)	1.1 (0.8 to 1.5)
≥6	2.0 (1.3 to 3.0)	2.0 (1.2 to 3.2)	1.7 (1.3 to 2.3)	1.2 (0.9 to 1.6)
Self-reported duration of mouse use at work, h/day				
0 to <2	1	1	1	1
2 to <4	0.9 (0.6 to 1.4)	1.1 (0.7 to 1.7)	1.0 (0.7 to 1.3)	1.1 (0.8 to 1.5)
≥4	1.5 (1.0 to 2.2)	1.4 (0.9 to 2.1)	1.6 (1.2 to 2.2)	1.5 (1.1 to 2.0)
Recorded duration of total computer use at work, h/week				
1 to <10	1	1	1	1
10 to <14	1.0 (0.7 to 1.4)	1.0 (0.7 to 1.5)	1.0 (0.7 to 1.4)	1.2 (0.8 to 1.6)
14 to 36	0.9 (0.6 to 1.4)	0.9 (0.6 to 1.4)	0.8 (0.5 to 1.1)	0.8 (0.6 to 1.1)
Recorded duration of mouse use at work, h/week				
0 to <5	1	1	1	1
5 to <7	0.8 (0.5 to 1.2)	0.8 (0.6 to 1.2)	0.8 (0.6 to 1.1)	0.8 (0.6 to 1.1)
7 to 22	0.9 (0.6 to 1.3)	0.9 (0.6 to 1.3)	0.8 (0.5 to 1.1)	0.8 (0.6 to 1.1)
Recorded duration of keyboard use at work, h/week				
0 to <2	1	1	1	1
2 to 3	0.8 (0.6 to 1.2)	1.0 (0.7 to 1.4)	0.9 (0.6 to 1.2)	1.1 (0.8 to 1.6)
3 to 13	0.7 (0.5 to 1.1)	0.7 (0.5 to 1.1)	0.8 (0.5 to 1.1)	1.0 (0.7 to 1.4)

Occup Environ Med 2011;68:502-509.

Go to the workplace !!



FIOSH

Conclusion

- Periodical assessment of the health status of employees to maintain work ability is not evidence based
  - And may be harmful
  - Except for some exposures to specific risk factors

- Using periodical examination to assess exposures at work may be misleading

- Go to the workplace to assess exposures

THANKS FOR YOUR ATTENTION