

Directions and challenges for future disability and disability management research

George L. Delclos, MD, MPH, PhD

The University of Texas School of Public Health
(Houston)

The Center for Research in Occupational Health,
Pompeu Fabra University (Barcelona)

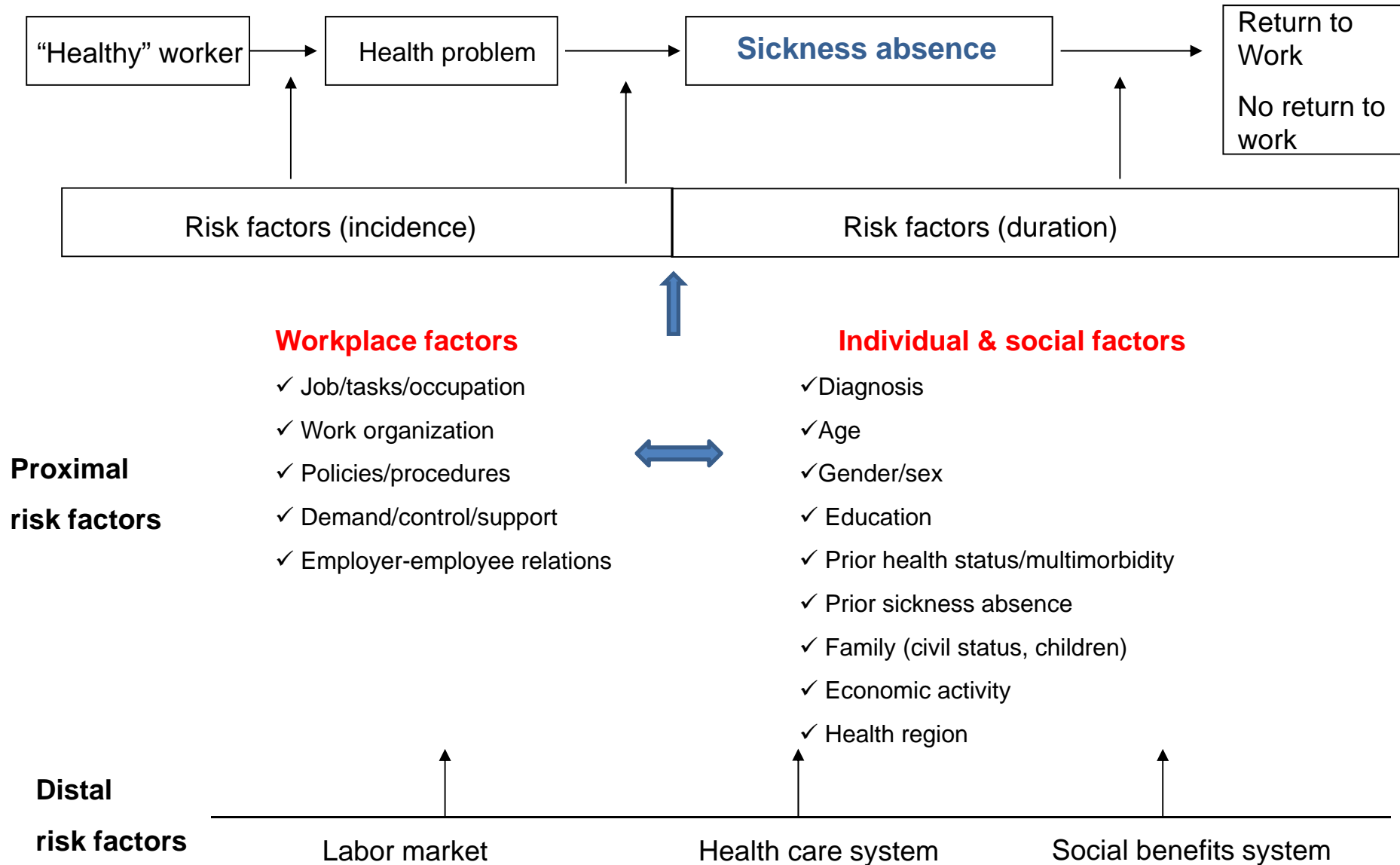
Disclosures

Conflicts of interest	None
Relevant relationships with companies	None

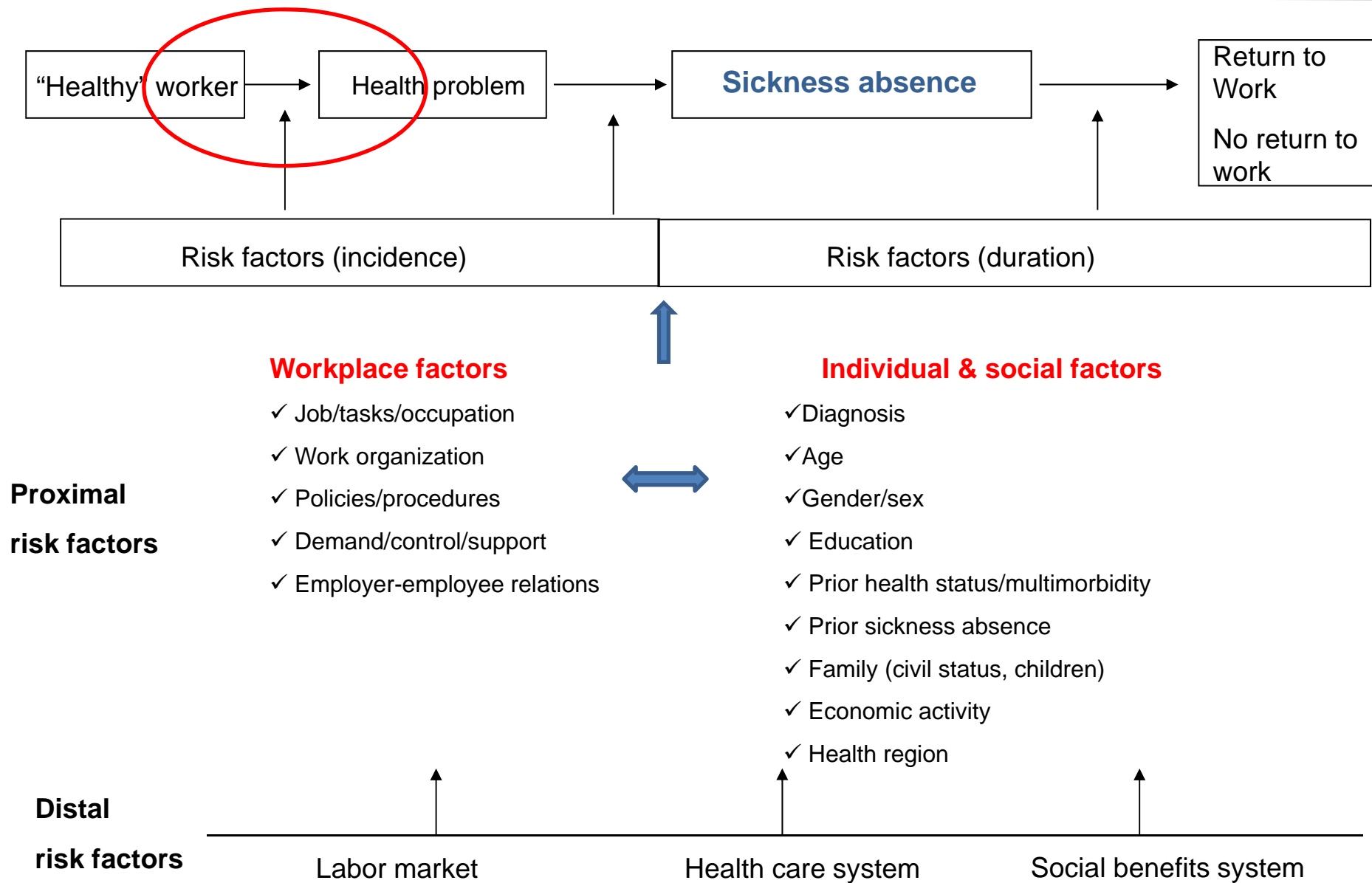
Objectives

- Review of approaches used in disability management research, some results and some limitations.
- Identify gaps in research as an indicator of future research needs.

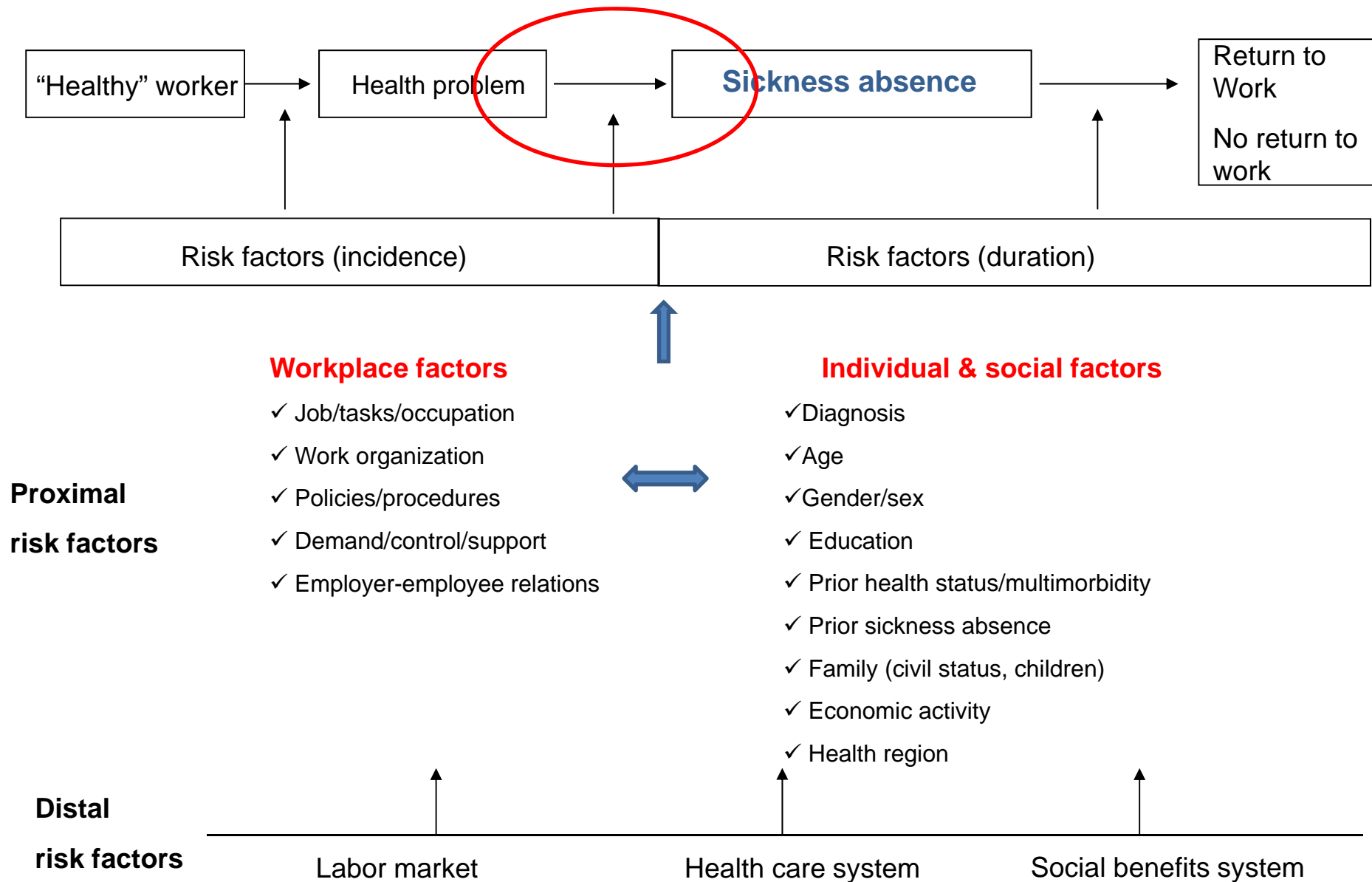
“Typical” Conceptual Model (Biopsychosocial) used in disability research



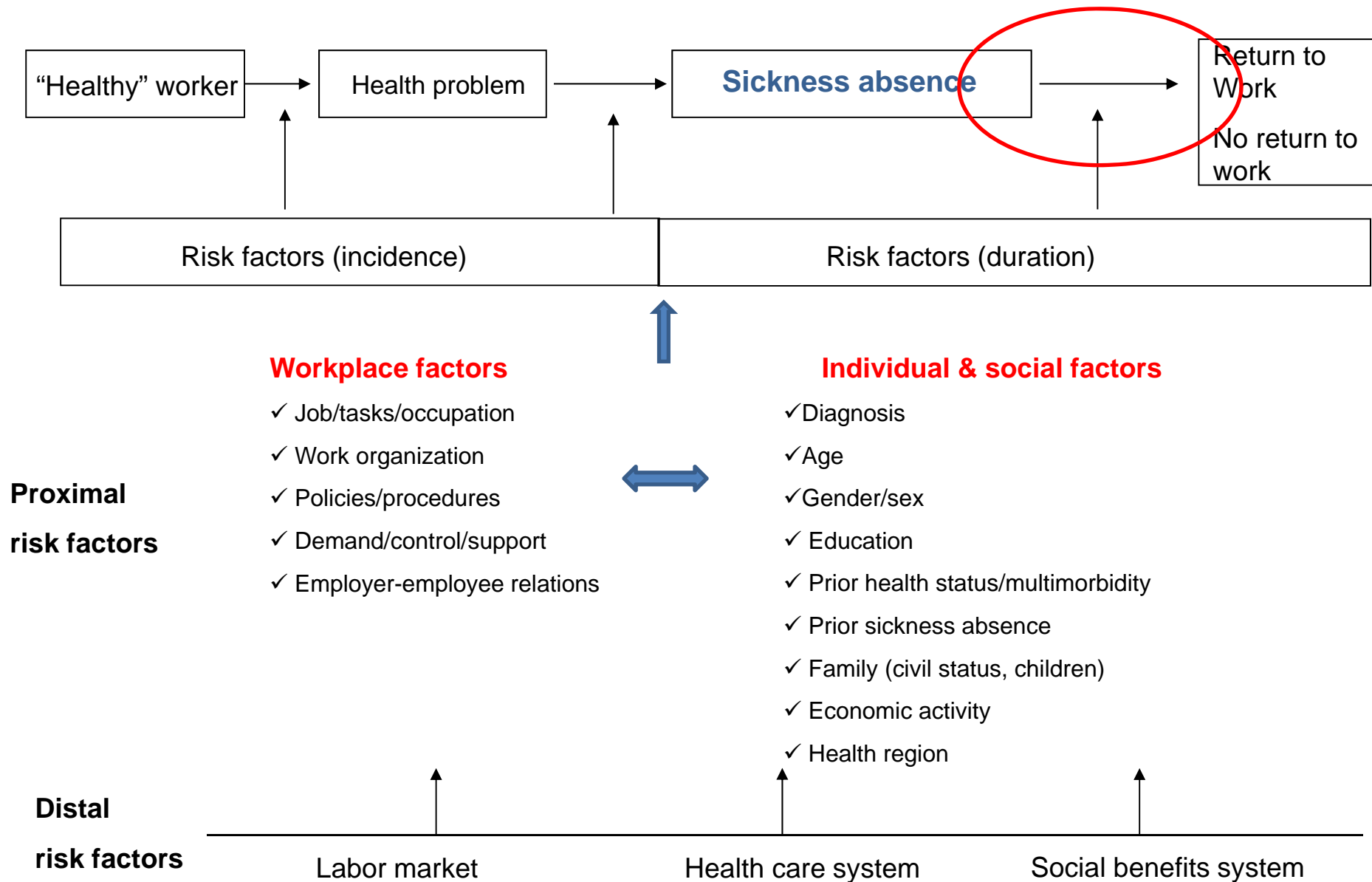
Primary prevention of disability



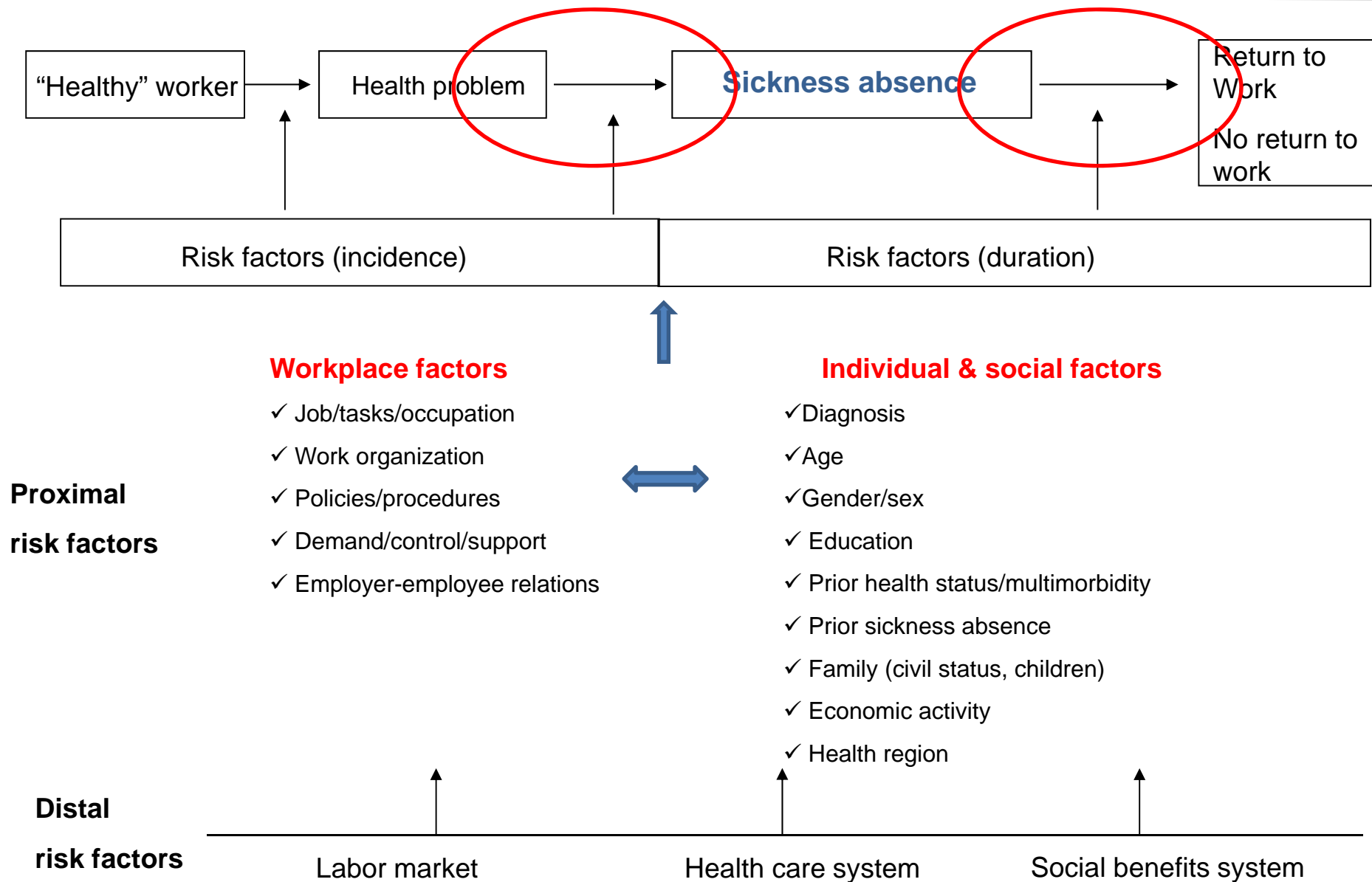
Secondary prevention of disability (disability management)



Tertiary prevention (disability management)

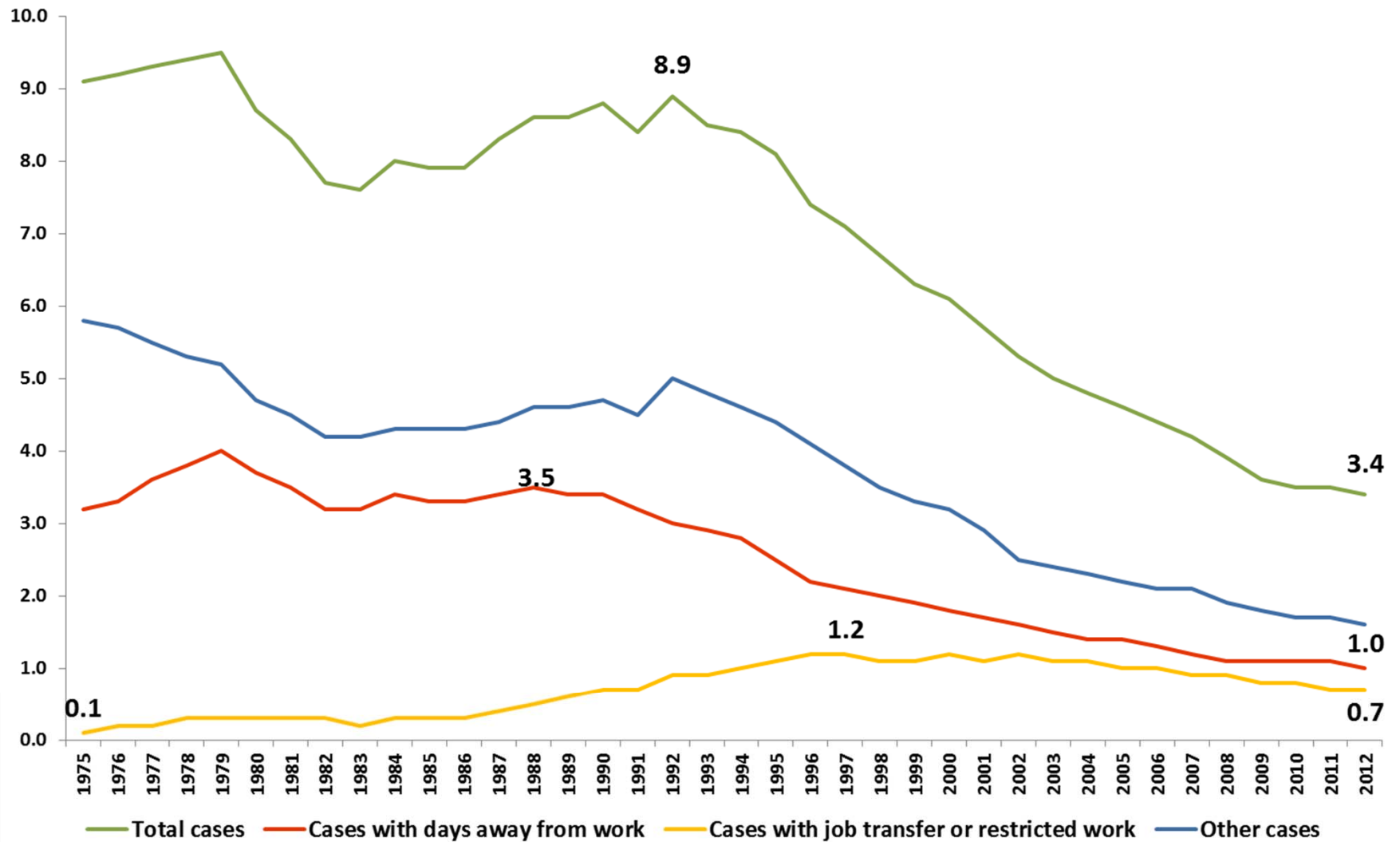


Disability management



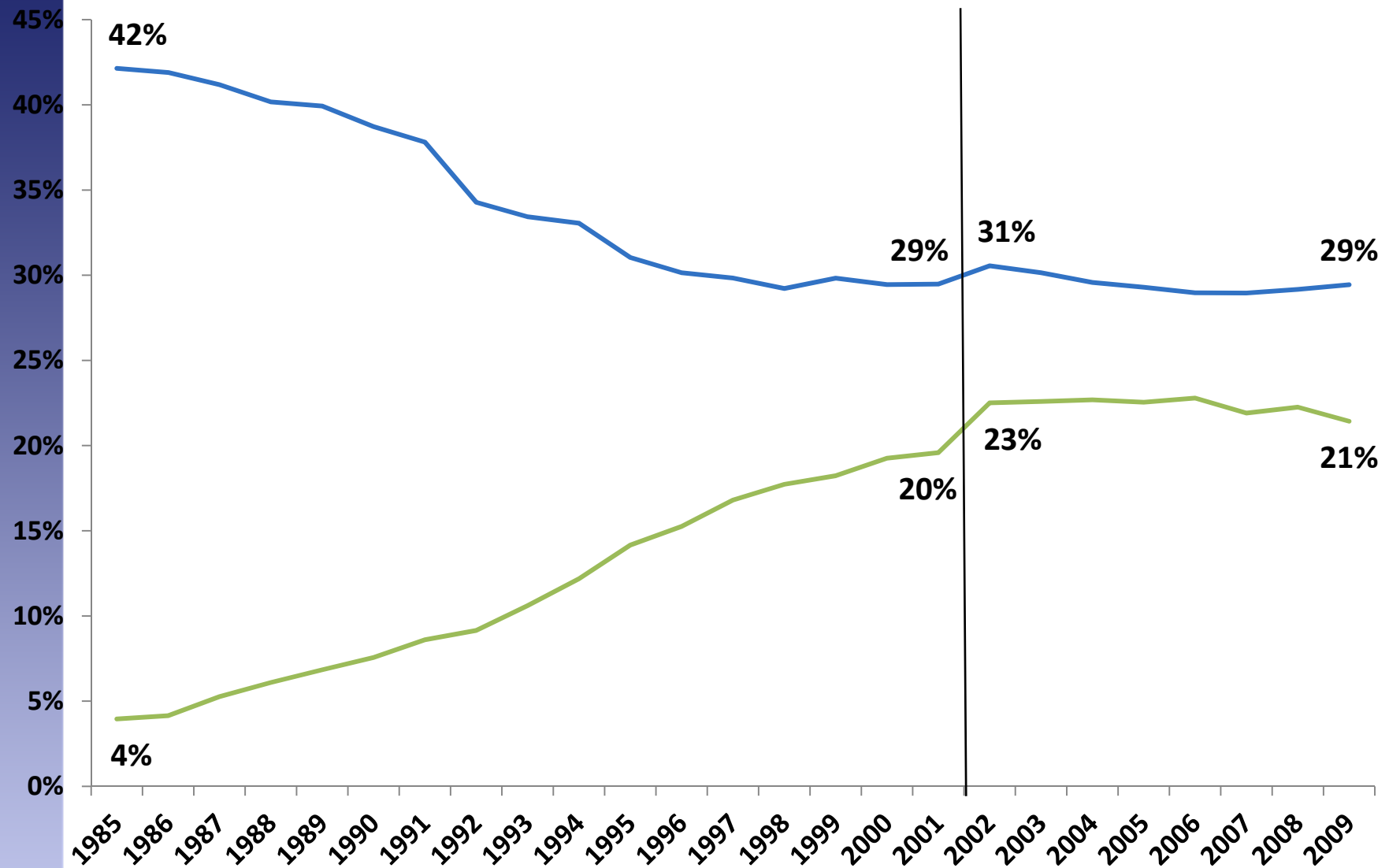
Simple statistics are still
meaningful

OSHA Recordable Injury and Illness Rates U.S. Private Industry, 1975 to 2012 (cases per 100 workers)



Source: U.S. Bureau of Labor Statistics (<http://www.bls.gov/iif/oshsum.htm>) and J. Ruser.

Percentage of all nonfatal injuries and illnesses, US



— Days away from work — Restricted work activity only

Source: U.S. Bureau of Labor Statistics (<http://www.bls.gov/iif/oshsum.htm>) and J. Ruser.



Simple statistics are still
meaningful.....but they don't tell
the whole story

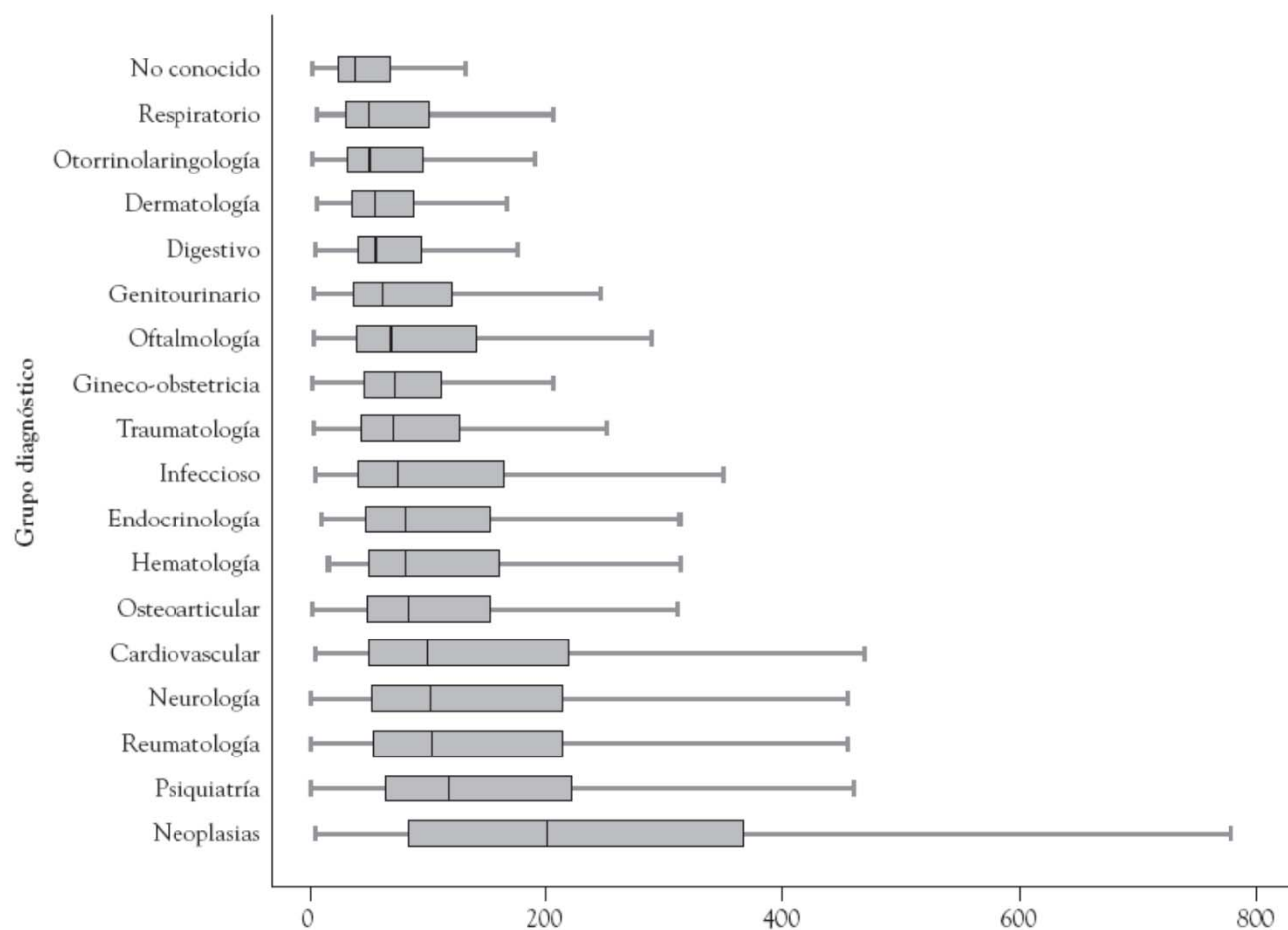
...because the devil may be in the details.



Individual Factors

Diagnosis and sickness absence duration

Figura 1. Duración de la incapacidad temporal por contingencia común (episodios de más de 15 días en trabajadores del Régimen General de la Seguridad Social y episodios de más de 3 días en trabajadores del Régimen Especial de Autónomos) según grupos diagnósticos (mediana, percentiles 25 y 75, rango).

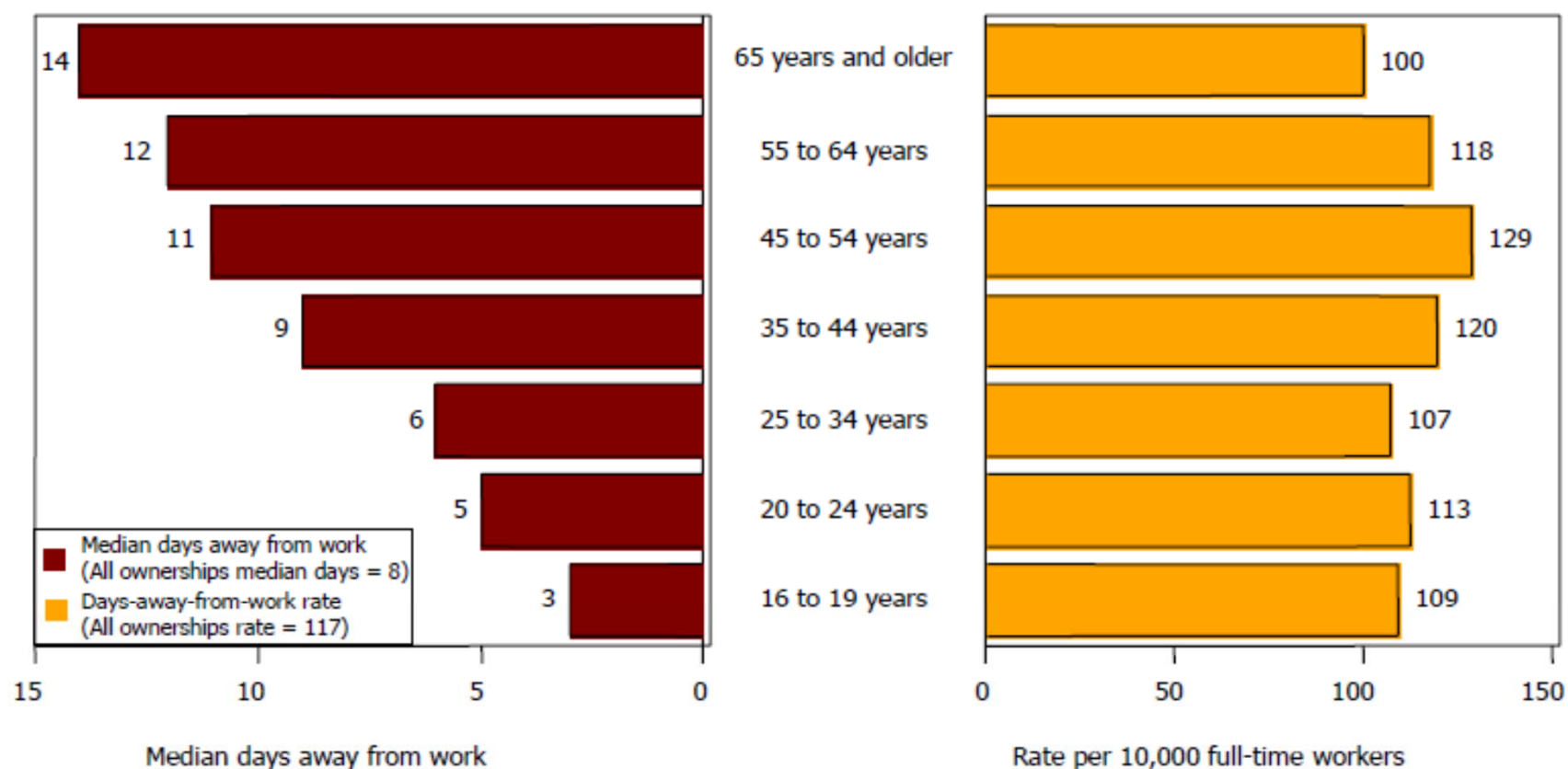


Diagnosis and sickness absence duration

Findings:

Musculoskeletal and trauma account for 40% of all lost work time episodes. Tumors and mental health disorders have the longest durations.

Median days away from work due to injuries and illnesses and incidence rate by age of worker, all ownerships, 2011



Median days away from work is a key measure of severity of injuries and illnesses. Injuries and illnesses become more severe as age increases, requiring 3 days away from work for workers aged 16 to 19 years old to 14 days for those workers 65 years and older. The rate of injuries and illnesses decreased from 2010 for workers 16 to 19 years old, and for workers 65 years and older.

Distribution of injuries and illnesses with days away from work and rates, by gender 2011



Injury and illness cases in state government were split relatively evenly between male and female workers, but male workers had a much higher rate. In local government, male workers had 60 percent of cases, and had a rate that was nearly double that of female workers.

How gender.....not just sex.....is handled matters.....

TABLE I. Final Models for “at Least One Absence for Respiratory Problems” Among Workers in Poultry Slaughterhouses and Canneries in France

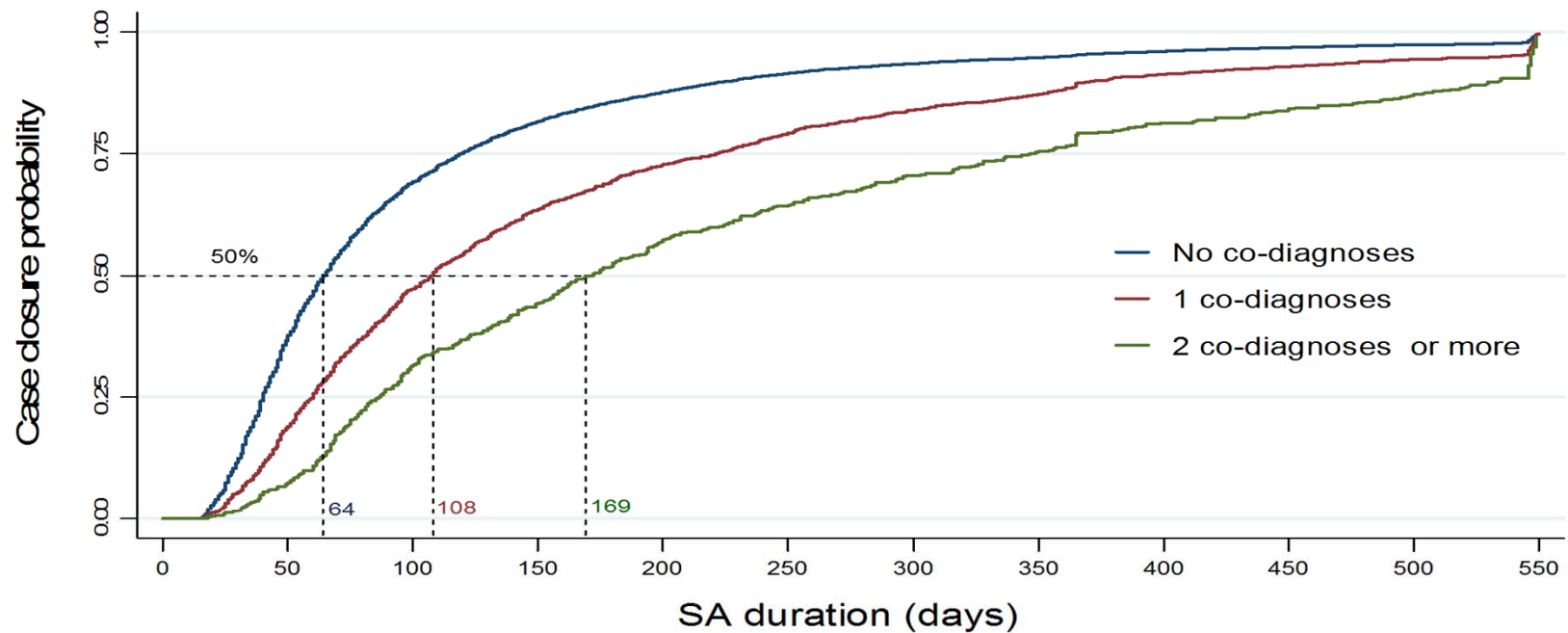
Exposure	Model derived for female workers	Model derived for male workers	Model derived for both sexes
Gas	3.1 (1.2–7.8)	0.9 (0.3–2.7)	1.5 (0.8–3.0)
Cold, humidity, drafts	2.2 (1.3–3.9)	1.4 (0.5–3.4)	2.1 (1.3–3.3)
Temperature <9°C	0.8 (0.4–1.2)	3.0 (1.6–5.7)	1.2 (0.8–1.9)
Dissatisfied with work relations	0.2 (0.1–0.9)	0.8 (0.2–2.7)	0.4 (0.2–1.1)
Children <6	2.3 (1.4–3.6)	1.3 (0.7–2.4)	1.7 (1.2–2.5)
Female sex	—	—	1.3 (0.9–1.9)

From Messing et al. [1998a].

Messing et al, 2003.

Co-existing morbidities matter.....

FIGURE 1 Case closure probability according to the number of co-diagnoses appearing over the course of the sickness absence episodes between 2004 and 2007.

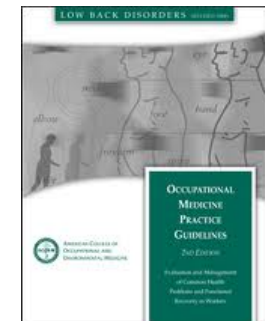


Ubalde-Lopez M et al, 2013.

Guidelines



- Official Disability Guidelines (Work Loss Institute) – “ODG” (<http://www.worklossdata.com/>)
- Medical Disability Guidelines (Reed Group) – “MDGuidelines” (<https://www.mdguidelines.com/>)
- Occupational Medicine Practice Guidelines (American College of Occupational and Environmental Medicine)- now part of Reed Group (<https://www.acoem.org/PracticeGuidelines.aspx>)



MD Guidelines: Predictive Model

Benchmark Against the Predicted Duration

Required Values

ICD-9-CM Code: 48.1 Days
Lumbago; Low Back Pain; Low Back Syndrome; Lumbalgia
Age: +0.6 Days
Gender: +0.2 Days
Job Class: +0.1 Days
Region (ZIP 1st digit): -35.5 Days

Co-existing Medical Conditions

Primary: 0 Days
Secondary: 0 Days
Tertiary: 0 Days

Other Factors

Worker's Comp: 0 Days

Predicted Days of Disability

13.5 Days

Manage Toward the Optimum Duration

Physiological Recovery Times

Days Saved Calculator

Start Date: 

Days for the Sedentary Job Class

Nonspecific treatment, low back pain.

	Minimum	Optimum	Maximum
	0	1	14
Days:		Predicted 13.5	Physiological <input type="text" value="1"/>
Return Date:		9/15/2014	9/3/2014

12.5 days can be saved on this case by meeting the optimum physiological recovery time for nonspecific treatment, low back pain.

Salary:

[Link to this case](#)

Source: Medical Disability Guidelines/Reed Group (<https://www.mdguidelines.com/>)

Evidence-based Return to Work Guidelines

- Increasingly being mandated in the U.S.
- Evidence evaluation is rigorous in all three of the discussed guidelines, but details are lacking on:
 - Effect of data sources on estimates/bias
 - Statistical methodology employed
 - Evaluation of their effectiveness in improving case management of sickness absence...i.e., the ultimate outcome.

Comparison of duration guidelines (de Boer et al, Eur J Public Health, in press)

- Literature review
- 4 guidelines from social insurance institutions (France, Serbia, Spain and Sweden)
- 4 guidelines from private organisations (1 Netherlands, 3 US)
- Direct comparison hampered by coding differences (ICD version, level of aggregation)
- Duration defined as minimum, maximum, and optimum or mean or median and percentile distribution, stratified to age and work requirements

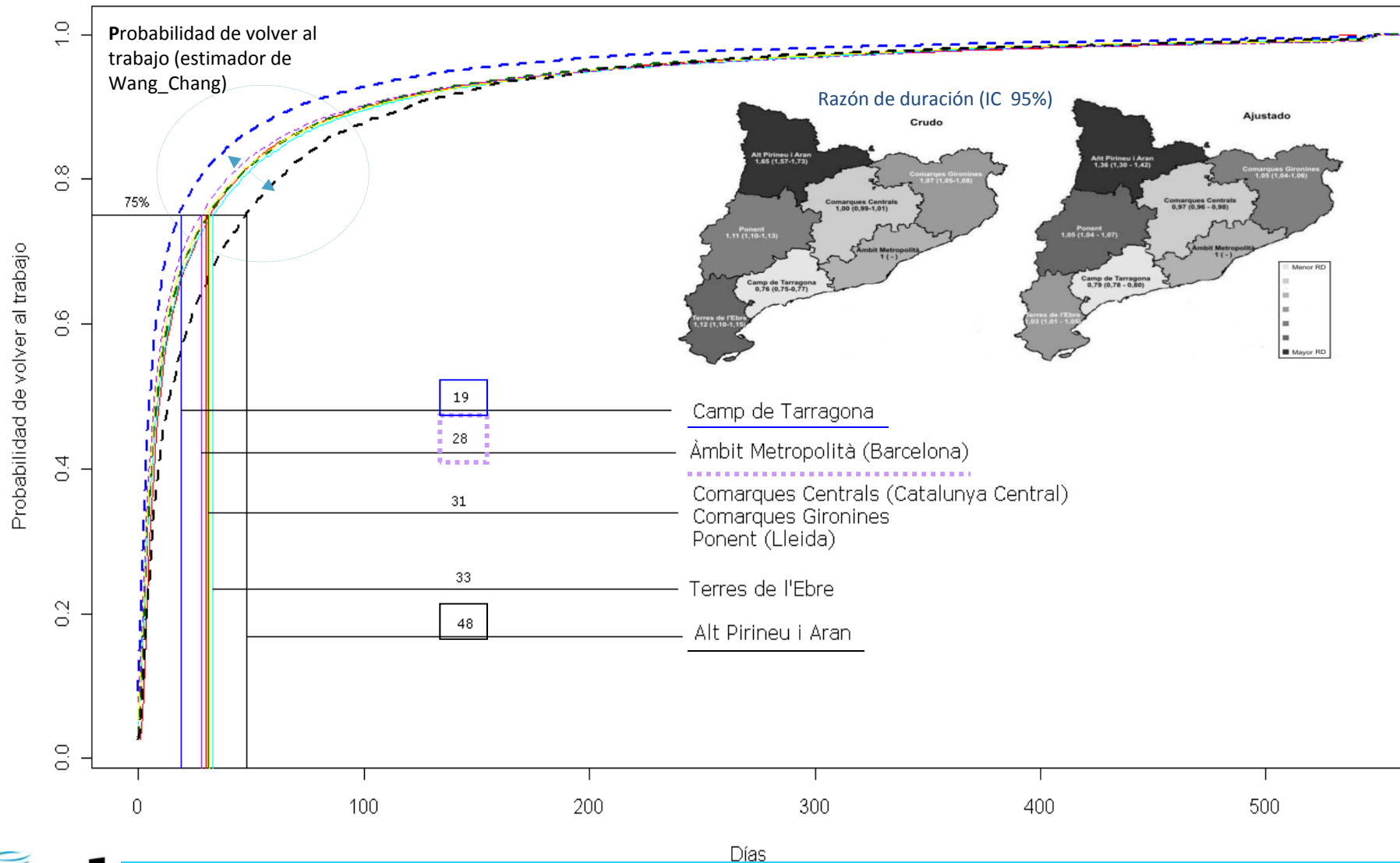
Comparison of duration guidelines (de Boer et al, Eur J Public Health, in press)

- In a sample of 5 diagnoses, there was overlap in expected duration but also differences.
- Guidelines are developed differently (pragmatic expert consensus, registry data, other guidelines, non-systematic reviews, etc.).
- Formal evaluation of their effectiveness is lacking.

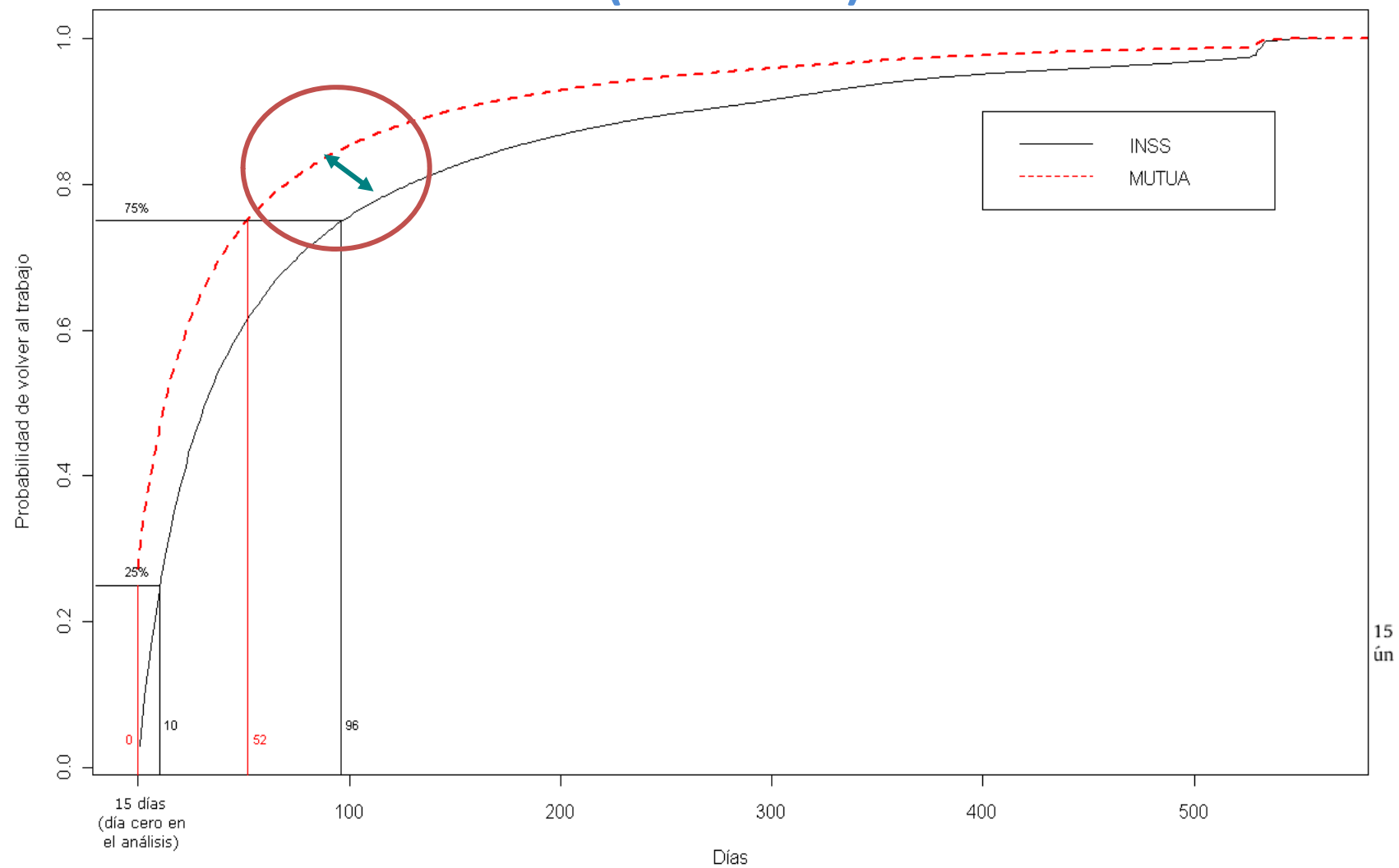
System Factors

SA DURATION BY HEALTH REGIONS (Catalonia)

811,790 SA episodes followed to case closure (2005).



SA DURATION BY CASE MANAGEMENT SOURCE (Catalonia)



Benavides et al, 2010.

Temporary sickness absence benefits: a tale of 3 countries.

Parameter	Netherlands	Spain	Sweden
Benefits offered (work and non work-related)?	✓	✓	✓
Who certifies?	Occupational doctor or insurance company advisor	Primary care doctor or occupational health insurance doctor	Any doctor
Maximum duration?	24 months	12 months with possible extension	12 months with possible extension
Sick pay (% of base salary)	At least 70%	At least 60% (80% if work-related)	80% (partial salary replacement allowed)
Prerequisites	Salary + insurance	Registered in social security system	Some income from work or unemployment benefits
Waiting period	From day 1	From day 1 (work-related) or day 4 (non work-related)	From day 1
Who pays?	Employer/insurance company x 24 months	Employer to day 14, then social insurance	Employer to day 14, then social insurance
Return to work plan?	Required	Optional	Required

Gimeno et al, 2014.

Workplace Factors

Working conditions (workplace factors) as a determinant of the “natural history” of sickness absence

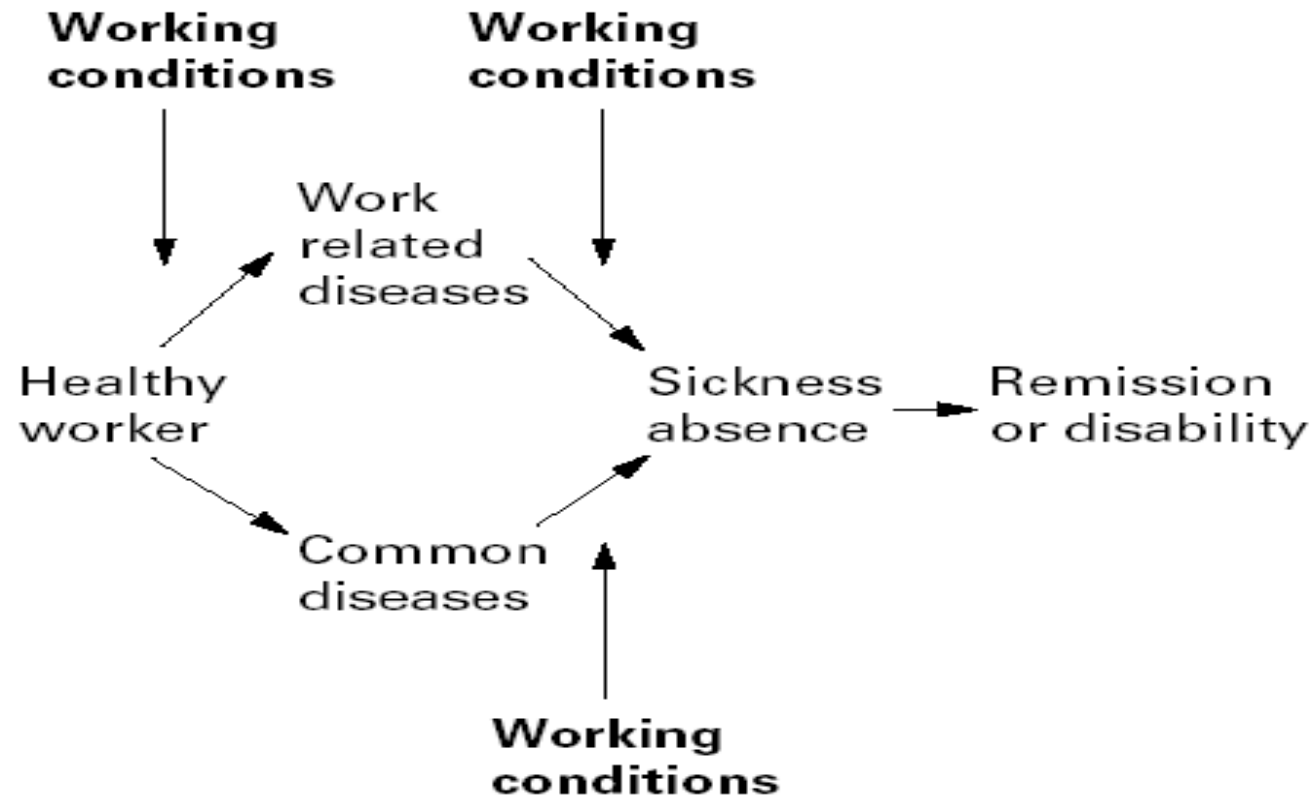


Figure 1 Simplified theoretical model of natural history of sickness absence.

Workplace factors: Organizational Support

ORIGINAL ARTICLE

Organizational Return to Work Support and Sick Leave Duration: A Cohort of Spanish Workers With a Long-Term Non–Work-Related Sick Leave Episode

Maite Sampere, MD, MSc, David Gimeno, PhD, Consol Serra, MD, PhD, Manel Plana, MD, José Miguel Martínez, PhD, George L. Delclos, MD, PhD, and Fernando G. Benavides, MD, PhD

Workplace factors: Organizational Support

Finding: Workers in companies that provided specific return to work programs and support returned to work earlier.

Workplace factors: RTW Expectations

J Occup Rehabil

DOI 10.1007/s10926-011-9313-5

Return to Work Expectations of Workers on Long-Term Non-Work-Related Sick Leave

**Maite Sampere · David Gimeno · Consol Serra ·
Manel Plana · Juan Carlos López · José Miguel Martínez ·
George L. Delclos · Fernando G. Benavides**

Workplace factors: RTW Expectations

Finding: Self-perceived time and return to work expectations are important prognostic factors for return to work, regardless of health condition.

Workplace factors: Working Conditions

Occupational Medicine
doi:10.1093/occmed/kqr141

SHORT REPORT

Effect of working conditions on non-work-related sickness absence

M. Sampere^{1,2}, D. Gimeno²⁻⁴, C. Serra^{2,4,5}, M. Plana¹, J. M. Martínez^{2,4}, G. L. Delclos^{2,4,6} and F. G. Benavides^{2,4}

¹Medical and Health Care Services Division, Mutual Midat Cyclops (MC MUTUAL), C/Provença 321, 08037 Barcelona, Spain,

²Center for Research in Occupational Health (CiSAL), Department of Experimental and Health Sciences, Universitat Pompeu Fabra, Barcelona, Spain, ³Southwest Center for Occupational and Environmental Health, Division of Epidemiology, Human Genetics and Environmental Sciences, The University of Texas School of Public Health, San Antonio Campus, San Antonio, TX, USA, ⁴CIBER de Epidemiología y Salud Pública, Barcelona, Spain, ⁵Occupational Health Service, Parc de Salut MAR, Barcelona, Spain, ⁶Southwest Center for Occupational and Environmental Health, Division of Epidemiology, Human Genetics and Environmental Sciences, The University of Texas School of Public Health, Houston, TX, USA.

Workplace factors: Working Conditions

Finding: Hazardous physical working conditions are associated with longer duration of non-work-related sickness absence. Workplace interventions could conceivably shorten this duration.

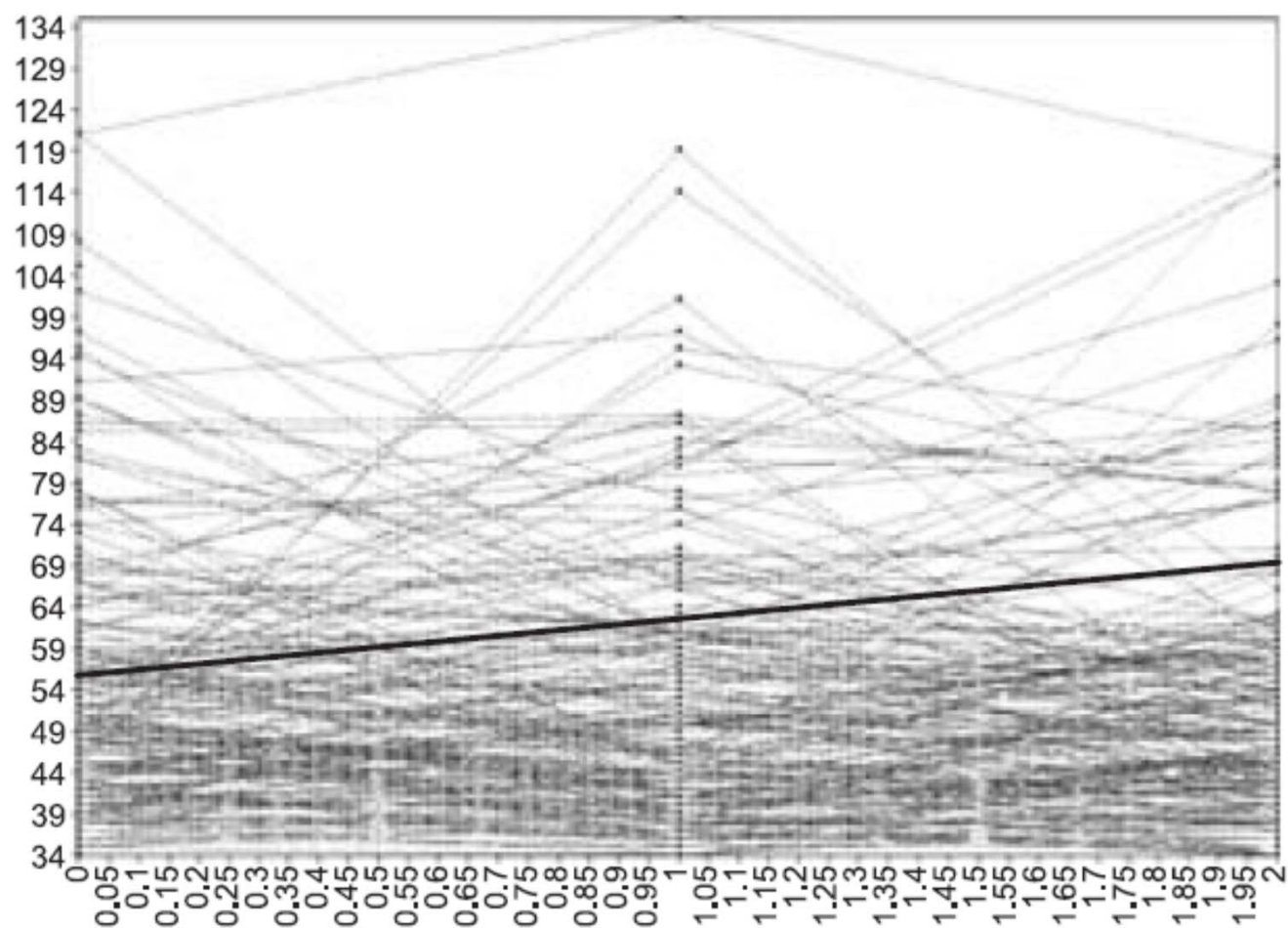
Individual x Workplace Factors

7 Principles for Successful Return to Work (IWH systematic review, 2014)

- Strong workplace commitment to health and safety (at all levels)
- Availability and offering of modified work
- RTW planners ensure plan supports returning worker without disadvantaging others
- Supervisors trained in work disability prevention and RTW planning
- Employer contacts worker early and in a considerate manner
- Designated RTW coordinator
- Good communication between employer and healthcare providers

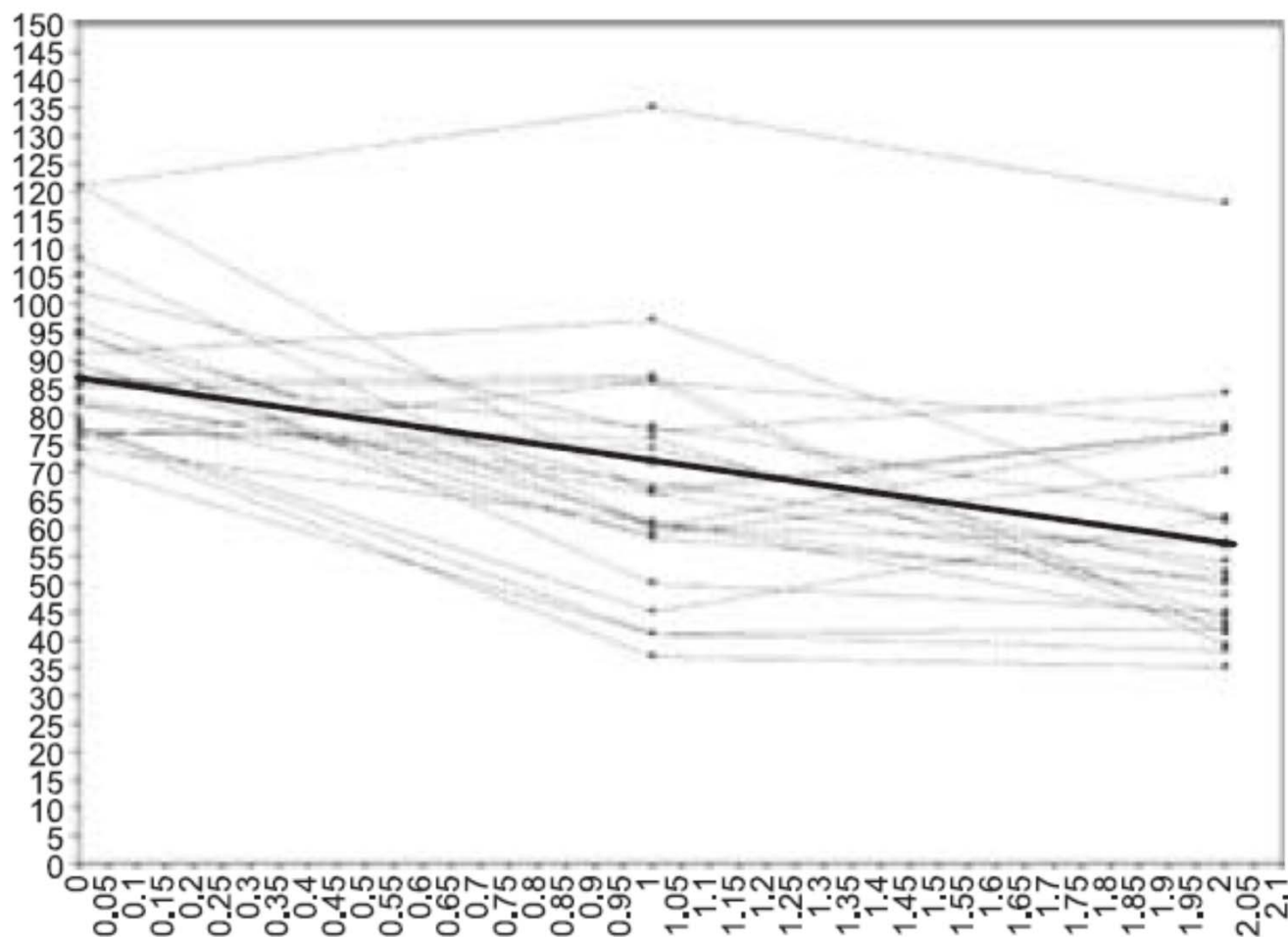
Some “new” statistical techniques
that are useful in evaluating
individual x workplace factors

Latent trajectory analysis



Jung and Wickrama, 2008.

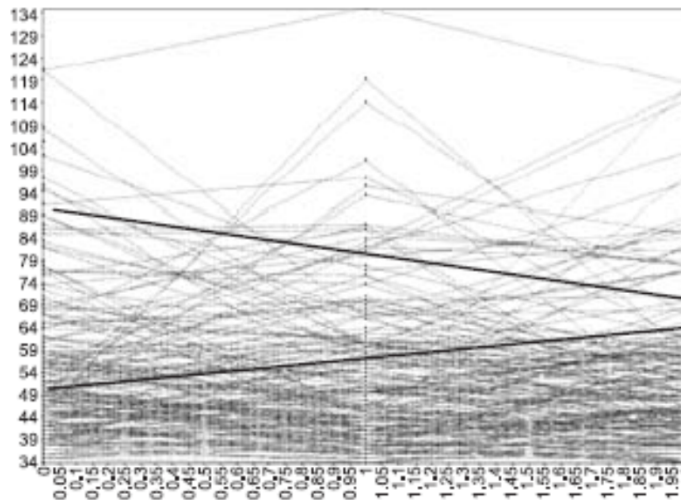
Latent trajectory analysis



Jung and Wickrama, 2008.

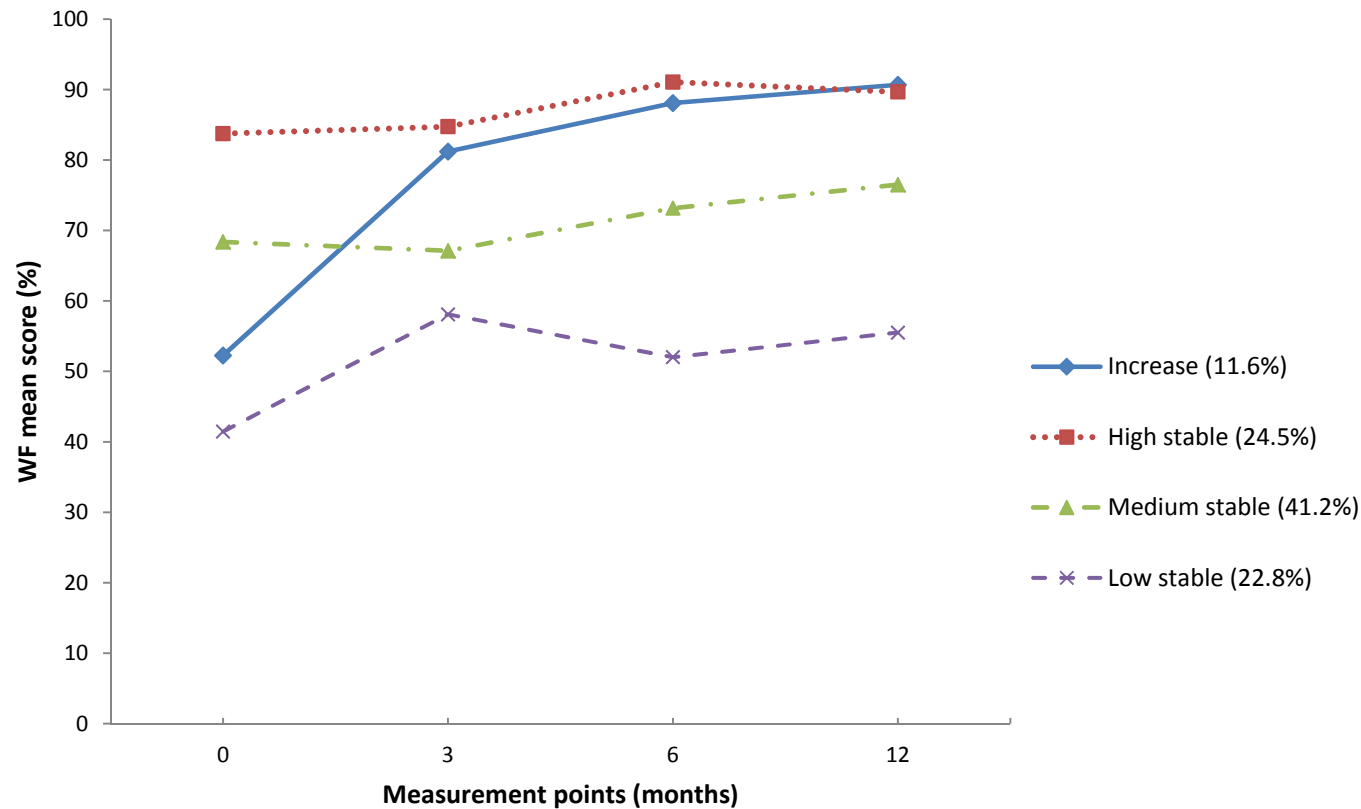
Latent trajectory analysis

There may be two different subgroups of individuals following different trajectories.



- Worsening mental health: $\hat{y}_{it}^{j=1} = \hat{\beta}_0^{j=1} + \hat{\beta}_1^{j=1} \cdot x_{it}$.
- Recovering mental health: $\hat{y}_{it}^{j=2} = \hat{\beta}_0^{j=2} + \hat{\beta}_1^{j=2} \cdot x_{it}$.

Trajectories of work functioning scores after return to work from a sick leave due to a common mental disorder.



Ubalde-Lopez et al, 2015 [under review]

Trajectories of work functioning scores after return to work from a sick leave due to a common mental disorder.

Finding: within the increasing score trajectory work functioning level decreased over time with the higher baseline multimorbidity. Multimorbidity did not affect the other 3 trajectories.

Other statistical approaches

- **Multi-level modeling:** allows separate consideration of individual-level variables (and their variance) and organizational/contextual-level variables (and their variance), before integrating them into a final model
- **Conditional frailty models:** allows consideration of:
 - Event dependence
 - Heterogeneity across individuals

Conditional frailty models

**BMC Medical Research
Methodology**



Heterogeneity and event dependence in the analysis of sickness absence

BMC Medical Research Methodology 2013, **13**:114 doi:10.1186/1471-2288-13-114

Isabel Torá-Rocamora (isabel.tora@upf.edu)
David Gimeno (David.Gimeno@uth.tmc.edu)
George Delclos (George.Delclos@uth.tmc.edu)
Fernando G Benavides (fernando.benavides@upf.edu)
Rafael Manzanera (rafael.manzanera@gencat.cat)
Josefina Jardí (josefina.jardi@gencat.cat)
Constança Alberti (constanca.alberti@gencat.cat)
Yutaka Yasui (yyasuiua@gmail.com)
José Miguel Martínez (jmiguel.martinez@upf.edu)

Conditional frailty models

Finding: Conditional frailty models are useful when repeated sickness absence events occur within the same individual, as they allow simultaneous analysis of event dependence and heterogeneity due to unknown, unmeasured or unmeasurable factors. Can be used with either Cox or Poisson approaches.

Conceptual Model

- Does the biopsychosocial model cover relevant themes for other stakeholders involved in disability management?
- Are there other considerations?
- Do researchers and employers communicate well?
- Do they share common views and outcomes?

Employer perspectives

- Rarely published in the “mainstream” scientific literature
- More present in the “grey” literature
- More anecdotal, personal experience, policy and “how to” oriented
- Primarily a large company perspective
- Little to nothing on small to medium-sized companies or self-employed workers

Employer “models”

- Medically driven
- Financially driven
- Employee-oriented
- Organizational culture-oriented

Research needs and next steps

- Individual factors
 - With a view towards an ageing population
 - Conceptually sound consideration of gender differences
 - Greater incorporation of co- and multi-morbidity
 - More “person-centered” (? phenotypes) rather than “variable-centered” (e.g., latent trajectory analysis, multiple correspondence analysis, perhaps cluster analysis)

Research needs and next steps

- Workplace factors
 - Applicability to small and medium enterprises
 - Applicability to self-employed workers
 - Incorporation of employer-relevant perspectives

Research needs and next steps

- Individual x Workplace
 - Use of large, “big picture” databases
 - More translational research (from the “ideal” controlled study to a “post-marketing” approach)
 - Use of “new” (and “newer”) study design and statistical analytical approaches

References

- Benavides FG et al. Gac Sanitaria 2010; 24(3):215.
- Benavides FG et al. J Epidemiol Comm Health 2001; 55: 368.
- de Boer WEL et al. Eur J Public Health 2015 [in press].
- Delclos J et al. Arch Prev Riesgos Laborales 2010; 13: 180.
- Gimeno D et al. Eur J Public Health 2014; 24 (4): 663.
- Jung T and Wickrama KAS. Social and Personality Psychology Compass 2/1; 2008: 302.
- Messing et al. Am J Ind Med 2003; 43:618.
- Sampere M et al. JOEM 2011; 53: 674.
- Sampere M et al. J Occup Rehab 2012; 22:15.
- Sampere M et al. Occup Med 2012; 62: 60.
- Torá Rocamora I et al. Rev Esp Salud Pública 2010; 84: 61.
- Torá Rocamora I et al. BMC Medical Research Methodology 2013; 13: 114
- Ubalde-Lopez M et al. JOEM 2013; 55:460.
- Ubalde-Lopez M et al. J Occup Rehab [under review].

Thank you.

