Participatory ergonomics interventions: A multiple case study

To date, evaluations of participative ergonomics (PE) interventions have shown mixed results *for the prevention of musculoskeletal disorders.* In a multiple case study of four worksites in different companies, Dr. Wells' team examined process, implementation and effects of PE interventions. This study was based on fieldwork and interviews with 90 people. The team was able to introduce 10 to 21 changes over 10 to 20 months, despite some challenges.

This plenary describes the research, which ultimately showed limited effects of PE interventions, and potential reasons that may account for this.

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RSI Awareness Day was established February 29, 2000...Read more

Spotlight

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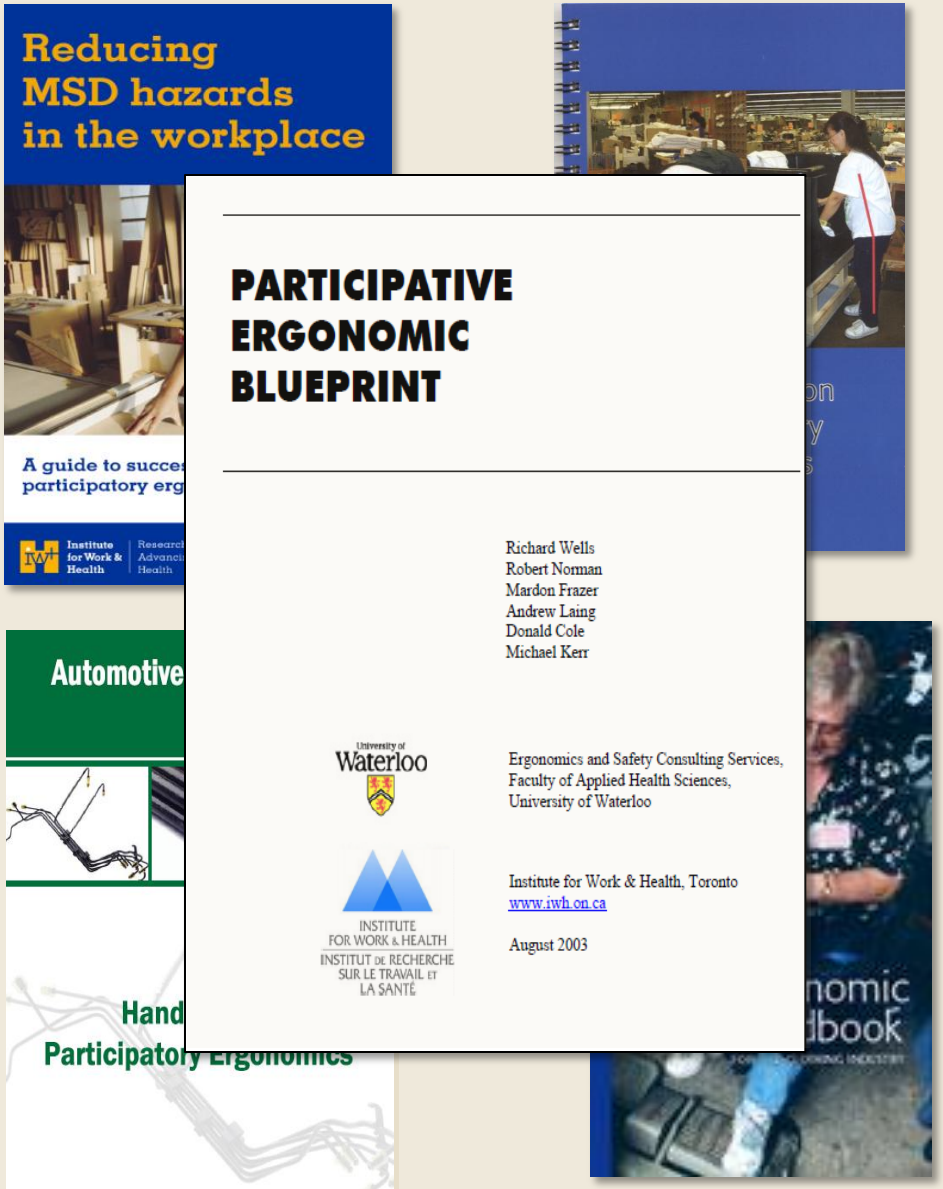
Reflecting on a program of participatory ergonomics interventions: A multiple case study



Richard Wells
University of Waterloo

RSI Day

- Feb 29th is the only non-repetitive day of the year and is International RSI Awareness Day
- RSI Day evolved from an idea by a Canadian injured worker, Catherine Fenech.
- Highlights the work hazards that cause strain injuries, undertakes workplace activities on strains prevention and presses for preventive action by employers and governments

Participatory ergonomics interventions: A multiple case study

- "Participatory Ergonomics" is often used in the prevention musculoskeletal disorders (MSD).
- Based upon a multiple case study of four worksites examining process, implementation and outcomes.
- Interventions showed limited effects of PE on MSDs
- Potential factors that may account for the results are explored.

Cole, D., Theberge, N., Dixon*, S., Rivilis*, I., Neumann, P., Wells, R. **Reflecting on a program of participatory ergonomics interventions: A multiple case study**, Work; 34:161–178, 2009.

Outline

- What IS “participatory ergonomics” anyway?
- Overview of the case study sites
- Outcome and process evaluation
- What we found
- Program and/or Theory failures or deficits
- Sustainability
- How we could do better

Particpation

Participation is a feature of many functions in an organization:

- Organizational Development
- Kaisen
- Total Quality Management
- Change Management
- ….

There are literally thousands of

Workers and employers must share the responsibility for occupational health and safety. This concept of an ***internal responsibility system***

Ontario Occupational Health and Safety Act 1979.

We make the decisions and the workers participate by doing the work

CSA Z1000 Occupational health and safety management

4.2.3 Worker participation is an essential aspect of the OHSMS in the organization. The organization shall

(a) provide workers and worker representatives with time and resources to participate effectively in the development of the OHS policy and in the process of OHSMS planning.

Some …. interventions … though providing much more widespread involvement, often restrict participation to less systemic issues…In fact, the careful training, guidance, and limits placed on most … programs reinforce behavior at the conformist or at best conscientious-conformist stage.

Pasmore and Fagans (1992)

Ergonomics

Ergonomics (or human factors) is the scientific discipline concerned with the understanding of interactions among humans and other elements of a system, and the profession that applies theory, principles, data and methods to design in order to optimize human well-being and overall system performance

Prevention of Musculoskeletal Disorders requires a wide range of approaches methods… the field of ergonomics provides many of them.

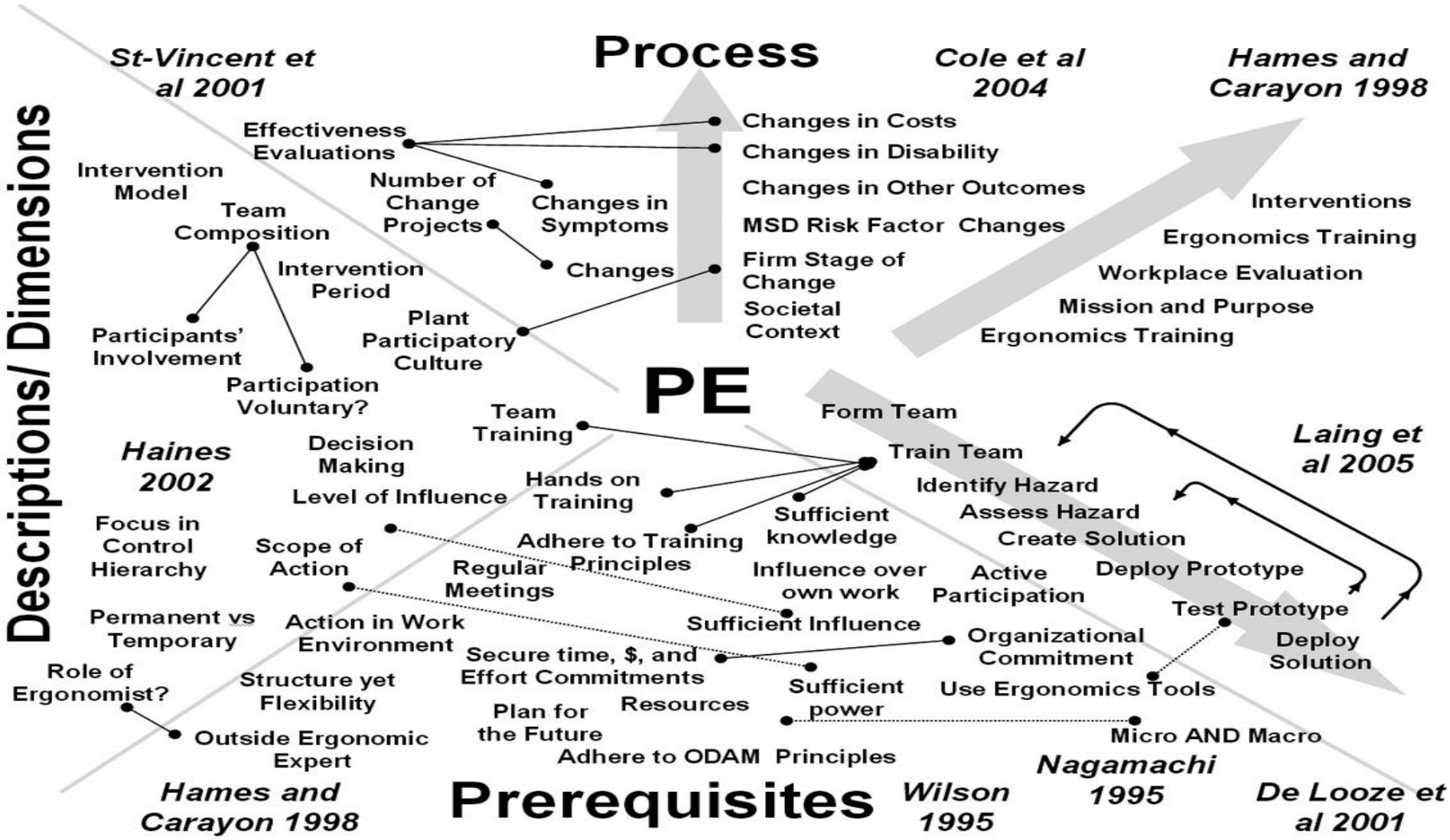
Areas of specialization include:

- Physical,
- Cognitive
- Organizational ergonomics

Particpation + Ergonomics = Participatory Ergonomics ?

- Is it a methodology, a technology, a philosophy, a goal…
- “The involvement of people in planning and controlling a significant amount of their own work activities, with sufficient knowledge and power to influence both processes and outcomes in order to achieve desirable goals” (John Wilson 1997)

Themes in Participatory Ergonomics



Case Companies

Courier	Garment	Large auto	Small auto

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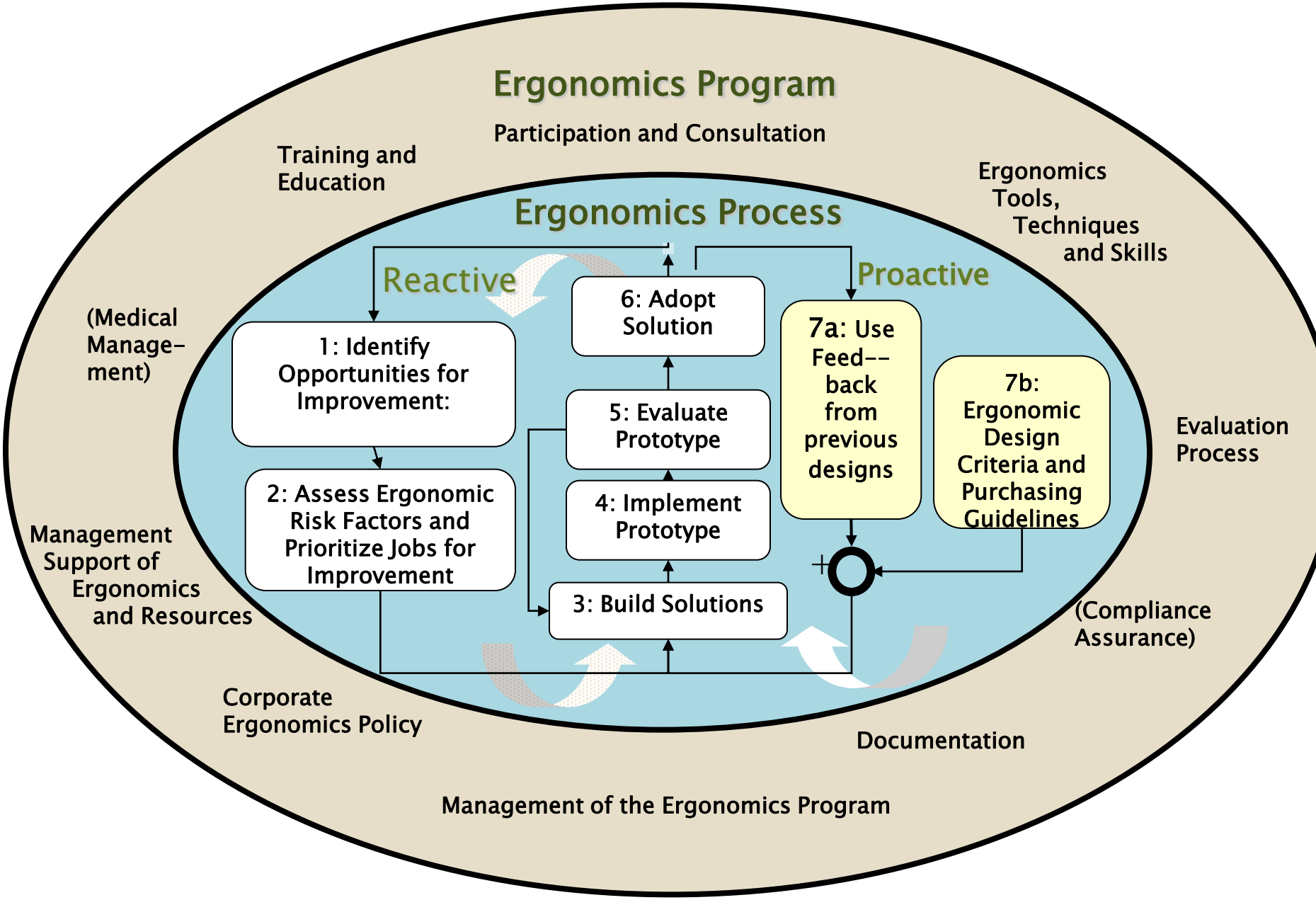
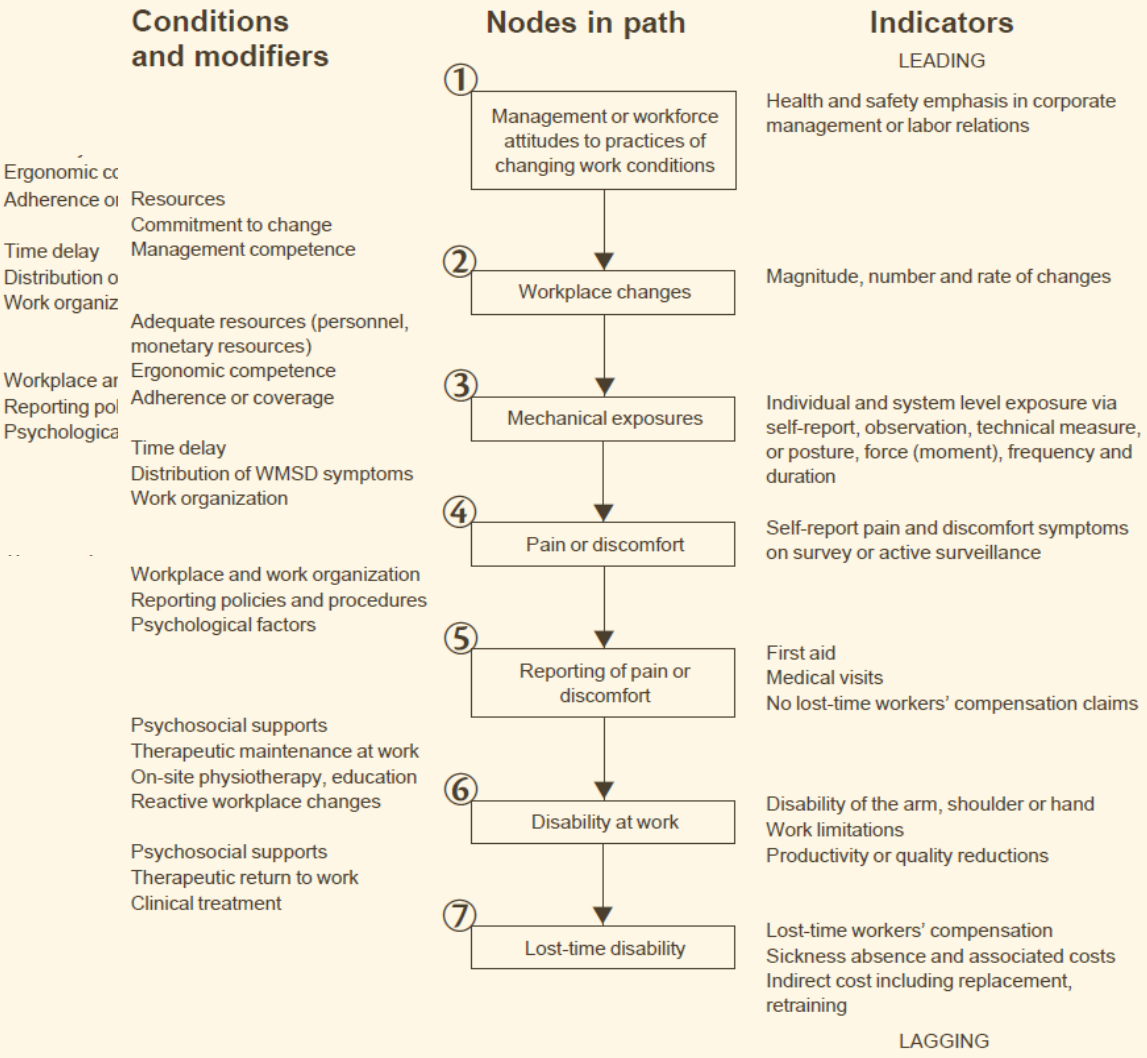

Ergonomics Program
Participation and Consultation
Training and Education
Ergonomics Tools, Techniques and Skills
Ergonomics Process
Reactive
Proactive
(Medical Manage-ment)
1: Identify Opportunities for Improvement:
2: Assess Ergonomic Risk Factors and Prioritize Jobs for Improvement
3: Build Solutions
4: Implement Prototype
5: Evaluate Prototype
6: Adopt Solution
7a: Use Feed--back from previous designs
7b: Ergonomic Design Criteria and Purchasing Guidelines
Evaluation Process
Management Support of Ergonomics and Resources
(Compliance Assurance)
Corporate Ergonomics Policy
Documentation
Management of the Ergonomics Program

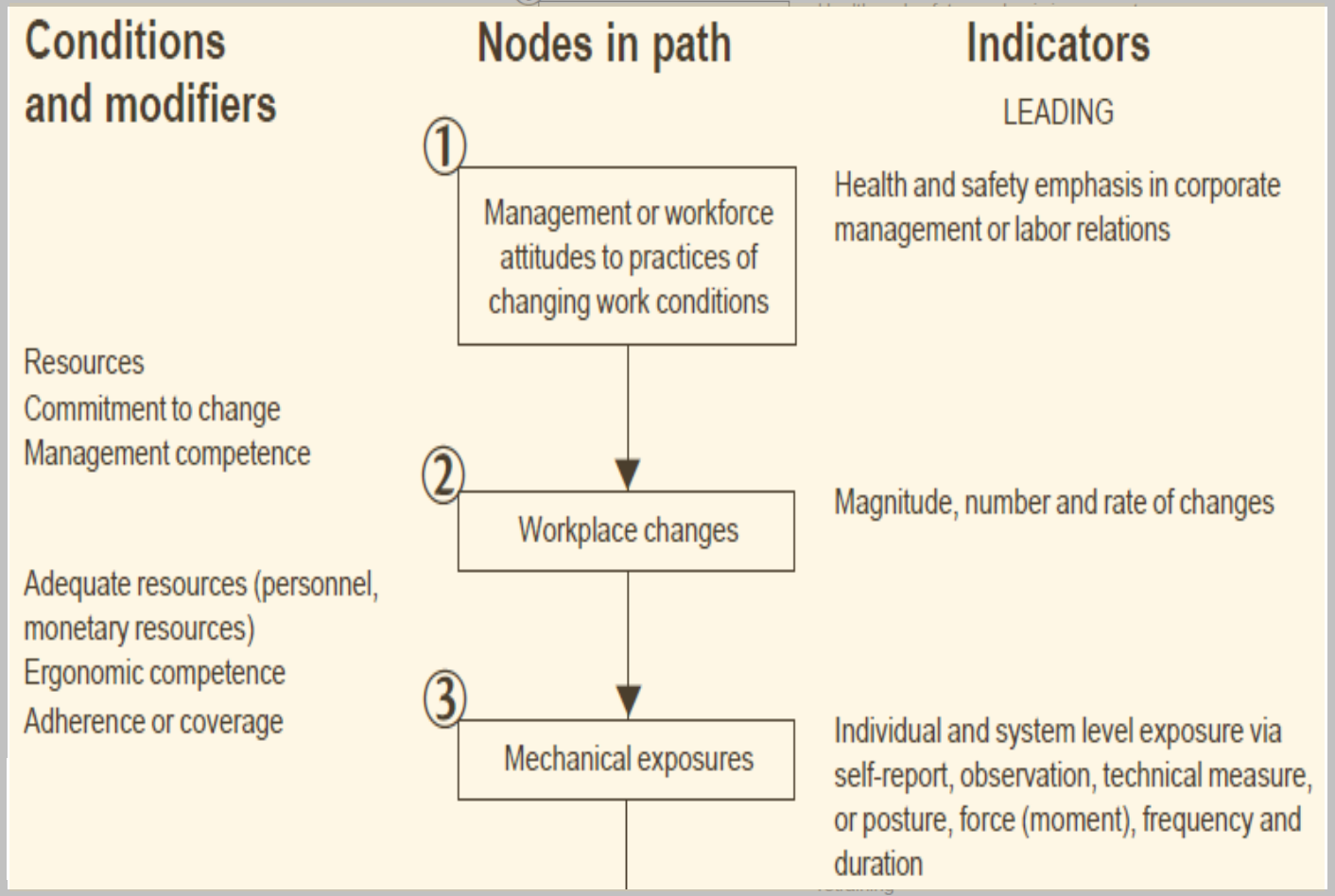
Case Studies I

	Courier	Garment	Large auto	Small auto
Mission Statement	Reduce MSD by implementing a plant wide program with possibility for larger implementation.	To reduce MSD in garment workers through workplace changes.	Reduce pain severity levels through interventions aimed at reducing workers' physical demands.	Systematically change the workplace to improve physical and psychosocial working conditions
Employee population	150	295	175	25
Knowledge of MSDs	Limited knowledge of MSDs	Limited knowledge of MSD	Substantial knowledge of MSDs among employees	Limited knowledge of MSDs

Outcome Evaluation



Outcome Evaluation (a)



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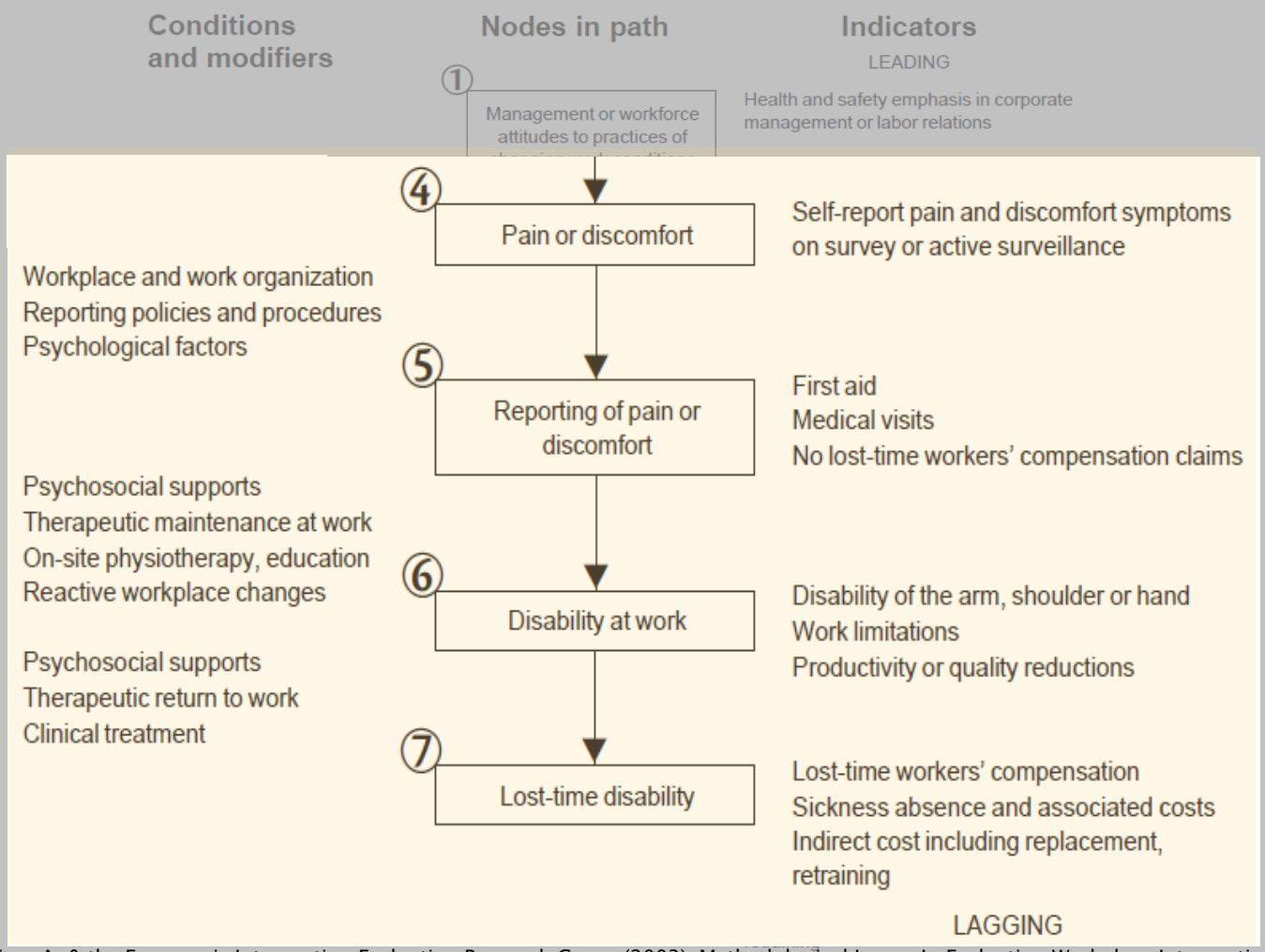
Outcome Evaluation (b)



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Process Evaluation

	Courier depots	Garment	Large auto	Small auto
Interviews	25	15	25	25
Who	Team members, middle and senior management and workers who were not on the team	Plant manager, team members, the operators, plant mechanics, a union president and supervisors.	Team members, middle and senior management and workers who were not on the team	Team members, middle and senior management and workers who were not on the team
Field observations	√		√	

Outcomes

	Courier depots	Garment	Large auto	Small auto
Changes	Physical design, work station, tasks, change in conveyor belt speed	Workstations, tools, e.g., adjustment of chairs, chair backs and tables, tilting of tables,	Layout, work stations, tasks e.g., redesigned parts racks, stands to raise parts bins,	Workstations, tools e.g., handle cut-outs on boxes, New trim tools, aluminium scrapers,
Facilitation duration	20 mo	32mo	16mo	13mo
Changes evaluated	14	17	10	21
Worker perceptions	Almost all changes rated favourably	Most changes rated favourably	Most changes rated favourably	Almost all changes rated favourably
Exposure decrease?	Small-Moderate	Mainly small	Mainly small	Small-Moderate

What we found...

Positive, but self-selecting organizations

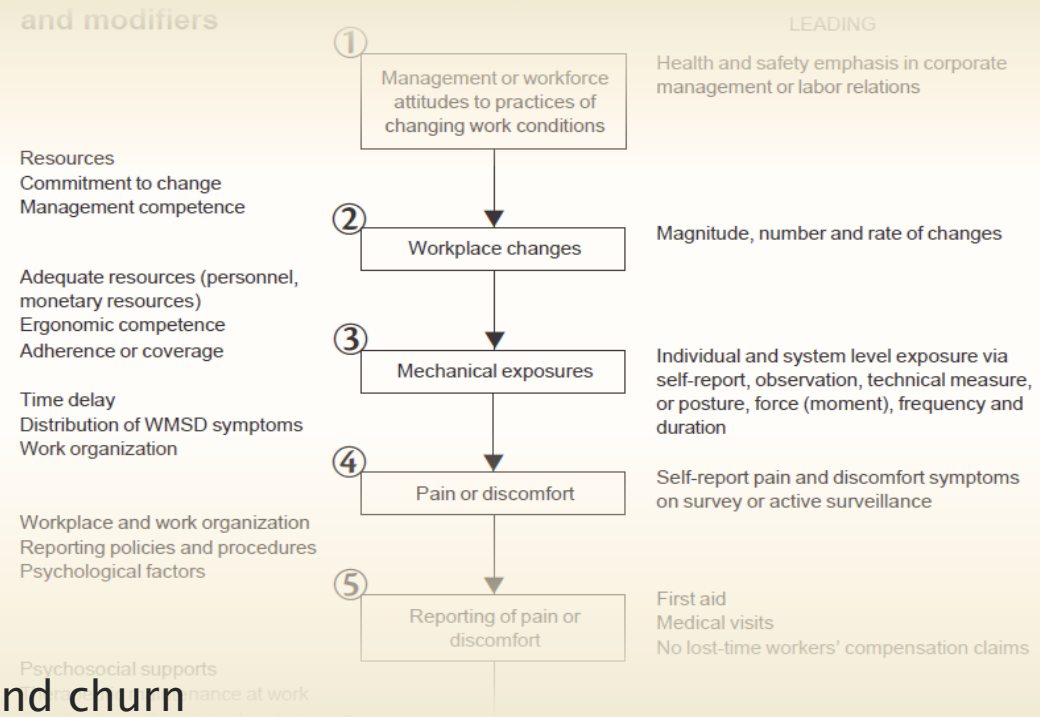
Yes, multiple changes

Yes, but actual exposure changes were small

Maybe but any changes were small

Maybe, but likely small or hidden by organizational noise and churn

The activities were not sustained



Despite the challenges, the companies', and especially worker's evaluations, were positive. The companies reported that other outcomes such management-labour relations and general work environment were positively affected

Program and Theory Deficits

A **program "failure" or deficit** comes about when the intervention is not implemented as planned. A **theory deficit** occurs if the theoretical underpinnings are judged wanting. .

- PE teams faced challenges securing employees' time (P), varying management commitment (P) and significant production pressures (P)
  - *"ergonomics is on the plate. But it's not the meat, it's the vegetables".*
- The changes introduced by the PE team were evolutionary rather than revolutionary leading, in the cases reported here, to limited exposure reductions (T+P).
- The PE literature is not clear on sustainability issues (T)

Sustainability

You have been working with a participative ergonomics team; things have gone well and many changes have been made. You withdraw and then come back 1 year later.

What would you hope to find on your return?

Sustainability

"Sustainability is when new ways of working and improved outcomes become the norm… In other words it has become an integrated or mainstream way of working rather than something 'added on'. …"

NHS Modernisation Agency (2002)

Barriers

1. Reaching the 'tough' or 'real' problems, having first addressed the 'easy' things, summed up by, 'we've picked all the low hanging fruit'
2. Reaching the limit of management commitment, as change affects them
3. Reaching the risky 'undiscussable' issues which might lead to conflict
4. Lack of systemic thinking, tackling symptoms not problems.

Senge 1999

Is it a project or longer term?

Teams with an exclusively "ergonomics" focus were short lived and disappeared quickly when faced with disruption.

Neumann

How to do better ?

Institutionalize:

- Goal Hooking
- Part of Occupational Health and Safety Management System (CSA Z1000/ Z1004)

Make sure it is "their" project… Ownership.

Hook to:

- Quality
- Cellular manufacturing
- Continuous improvement
- Lean/6 Sigma
- ….

Musings

- If it is evolutionary, small wins (good!) may take a long time to make large enough exposure changes to have an effect on lagging injury indicators
- Is it an "island" in the organization. Can it last long enough to show effects. Can it withstand the realities of the churn in organizations?
- For longer term sustainability, get it institutionalized.
- It is not "just" a health and safety issue…Goal Hooking
- Why has the adjective "participatory" been used with ergonomics but not safety or hygiene or……? Why don't we talk about participatory work environment improvement?
- Participatory ergonomics is one way of getting ergonomics implemented.

http://en.wikipedia.org/wiki/Participatory_ergonomics

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