

Erasmus MC  
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**Cost-effectiveness of an intervention for workers on sick leave due to low-back pain is not a fixed trait of that intervention**

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**Return-to-work for low back pain**

Percentage of Claimants Still on Benefits

Time (Weeks) Since Pain Onset

Quebec task force. Frank et al Spine 1996

**Return-to-work for low back pain**

Proportion of claimants ending benefit (%)

Time (weeks) since onset of lost-time claim

The ideal structured RTW intervention

**When to do what ?**

Considerations in decisions on structured interventions:

1. Effective intervention
2. Costs and benefits of the intervention
3. Timing of enrollment of persons in intervention
4. Duration of intervention

**Effective interventions**

Examples from the literature of RCTs on structured interventions:

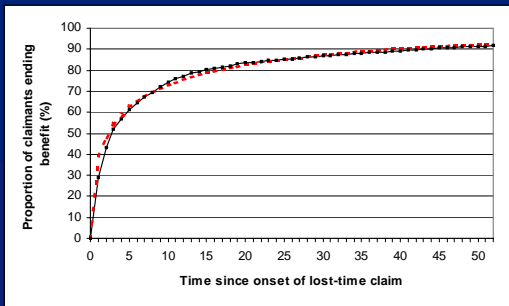
Loisel 1997	Workplace interventions after 6 weeks	HR = 1.6
Anema 2007	Workplace interventions after 6 weeks	HR = 1.7 (1.2-2.3)
Hagen 2000	One 3 hr-visit at spine clinic at 8-12 weeks	HR = 1.2 (1.1-1.4)
Indahl 1997	Stay active advice 3x at 8-12 weeks	HR = 2.2 (1.8-2.8)
Hlobil 2005	Graded activity 2x/weeks (12) at 8 weeks	HR = 1.9 (1.2-3.1)

Are these results applicable to other target populations with different natural course of RTW ?

**Natural course of RTW in target population**

- \* Weibull distribution:
  - survival function  $S(t) = \exp(-(t/\lambda)^k)$
  - whereby  $t$  = time
  - $\lambda$  = scale parameter (function of different covariates)
  - $k$  = shape parameter ( $k < 1$  decrease over time)
- \*  $\lambda = \exp(b_0 + b_1 * x_i)$  (function of different covariates, eg. intervention)
  - intervention effect =  $\exp(-b_1 * k * x_i)$  whereby  $x_i = 1$  for intervention
  - intervention effect HR =  $\exp(-b_1 * k)$
- \* HR from literature can be used to adjust scale parameter

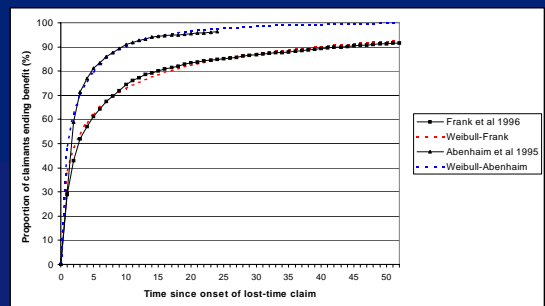
### Natural course of RTW in target population



$\lambda = 5.4$  (scale parameter)  $k = 0.42$  (shape parameter)



### Natural course of RTW in target population



Frank:  $\lambda = 5.4$ ,  $k = 0.42$  Abenheim:  $\lambda = 2.1$ ,  $k = 0.54$



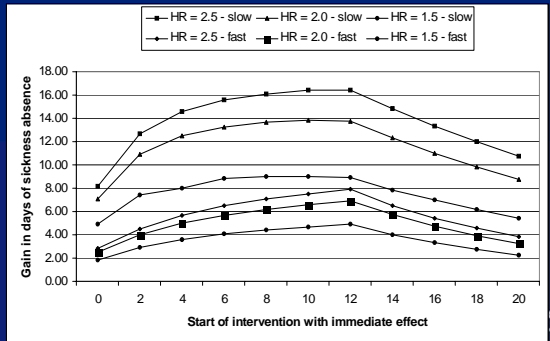
### Structured intervention on natural course of RTW

- \* Select intervention HR from literature: eg. HR = 1.5 to 2.5
- \* Introduce selected HR in natural course of RTW
- \* Evaluate different options, such as:
  - introduction of interventions at different times
  - effect of interventions occur after x weeks
- \* Evaluate costs and benefits options

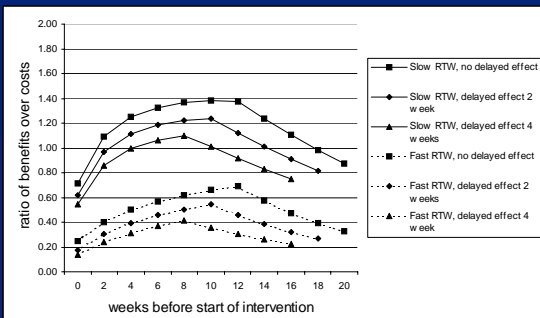
[modelling approach as alternative to conducting several RCTs]



### Theoretical modelling of the effects of an intervention on RTW in target population



### Theoretical modelling of the effects of an intervention on RTW in target population (HR = 2.0, €1000)



### Final conclusions

1. Considerations in decisions on structured interventions: effective intervention, costs and benefits of the intervention, timing of enrollment of persons in intervention, and duration of intervention
2. Natural course of RTW in target population has profound implications on costs-benefits and, thus, on classical considerations
3. It is extremely important that authors of an RCT publish the full RTW curves (Kaplan-Meier curves) in intervention and control group, since RTW will differ substantially (eg. eligibility, income)
4. Cost-effectiveness of an intervention for workers on sick leave due to low-back pain is not a fixed trait of that intervention
5. Thus....the generalisability of the effectiveness of an intervention cannot be summarized in an average effect size across different populations



*Greetings from Rotterdam*



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