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Transferring results of occupational safety and health cost-effectiveness studies from one country to another – a case study

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Objectives There are a limited number of studies about the cost-effectiveness of occupational health and safety (OSH) interventions. Applying the results of a cost-effectiveness study from one country to another is hampered by differences in the organization of healthcare and social security. In order to find out how these problems can be overcome, we transferred the results of a Dutch occupational cost-effectiveness study to the Finnish situation and vice-versa.

Methods We recalculated incremental cost-effectiveness ratios (ICER) for the target country based on resource use in the original study and the associated costs in the target country. We also allocated the costs to the employer, the employee, and tax-payers.

Results We found that the ICER did not differ very much from those in the original studies. However, the different healthcare funding structure led to a more unfavorable ICER for employers in the Netherlands. Both interventions represented a cost saving for tax-payers and employees. Employers had to invest €10–54 to avert one day of sick leave.

Conclusions We conclude that results of cost-effectiveness studies can be transferred from one country to another, but many adjustments are needed. An extensive description of the intervention, a detailed list of resource use, allocation of costs to various parties, and detailed knowledge of the healthcare systems in the original studies are necessary to enable calculations.

Key terms economics; OSH

It is increasingly acknowledged that evidence resulting from scientific research is one of the cornerstones of decision-making in healthcare and healthcare policy (1, 2). To be able to make an informed decision, it is very helpful to know if the intervention under consideration is effective in reducing the adverse health outcome compared to an alternative intervention or the option of doing nothing. In addition to effectiveness, information about the costs involved is important information for decision-makers. Costs are examined in economic evaluation studies, of which cost-effectiveness studies are the most prominent. These are defined as studies that evaluate the relationship between a net investment and health improvement in healthcare strategies competing for similar resources (3, 4). Results can be presented as "cost per adverse health outcome prevented". When two alternatives are compared on a similar outcome, the incremental cost-effectiveness ratio (ICER) can be used. The ICER shows how much extra money is needed for the intervention versus the alternative in order to prevent one additional adverse health outcome and has the dimension of an amount of money per adverse health outcome. Alternatively, the results can be presented in generic terms: it is the amount of money needed to add one extra quality-adjusted life year.

In occupational safety and health (OSH), there are not many cost-effectiveness studies; of those that exist,

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the methodological quality is not high (5). Moreover, it requires extra resources to conduct cost-effectiveness studies. Therefore, it makes sense to use existing results as widely as possible. However, for several reasons it is not easy to apply the results of cost-effectiveness studies across countries or jurisdictions. One reason is that healthcare and social security systems are organized differently and thus the source and use of resources for an intervention may vary from country to country. Similarly, the costs and benefits and allocation of an intervention' costs will vary between countries (6). An additional problem in OSH is that most cost-effectiveness studies are carried out from the societal point of view. This means that all costs and benefits are summed up regardless of where and by whom they are paid. This is an obvious problem in OSH where the employer pays for an intervention and society at large benefits through reduced healthcare costs and vice-versa (5). In addition to the societal point of view, decision-makers should be informed about the allocation of costs both to the employer and employee.

Therefore, there is a need to adapt results of cost-effectiveness studies to different circumstances (ie, different practices and different costs). Sculpher et al (6) have studied this for general healthcare interventions. According to their proposal, the simplest way to transfer the results is to recalculate the monetary value of resource use for the target country where the results are to be applied and then recalculate an ICER. On a more complicated level, they propose to do a full decision analysis.

We performed two case studies, in which we followed Sculpher et al's advice on how to transfer the results of cost-effectiveness studies between countries. To this end, we used the studies performed by Taimela et al in Finland (7) and Steenstra et al in the Netherlands (8) because they included fairly detailed descriptions of resource use. We transferred the Finnish results to the Netherlands and vice versa.

Methods

The original studies and their context

Finnish sick leave prevention study. Taimela et al (7) evaluated an occupational health intervention program for workers at high risk for sickness absence. A health risk appraisal questionnaire, sent to 3115 employees of a Finnish company, identified 418 employees at high risk for sickness absence who were willing to participate in the study. They were randomized into an intervention group (N=209) and a "care-as-usual" group (N=209). The intervention consisted of a visit to the occupational health nurse and physician and, if needed, a referral to other healthcare providers. The care-as-usual group was not invited to the occupational health service. The primary outcome (ie, the mean difference in the number of sick leave days at 12 months follow-up between the intervention and the control group) differed significantly from 0 with -11 sick days [95% confidence interval (95% CI) -1– -20]. In the economic analysis, the direct healthcare costs up to one year after randomization were estimated based on a questionnaire survey. Data were available for 138 subjects in the intervention group and 134 in the control group; for this subgroup, the mean difference was -1.7 sick days. No production loss costs were calculated as the primary outcome was already sick leave days. The costs of the use of the screening instrument were not included.

At one year follow-up, and from the societal point of view, avoiding one day of sickness absence with the intervention was on average associated with €43 less costs than with care as usual for the group for which questionnaire data were available. When the missing data were imputed for all trial participants, the corresponding figure was €17. This indicates a better result because more money was saved and more days of sickness absence avoided. For this article, we used the figures for the subgroup for which all costs figures could be derived from the questionnaire and as reported by Taimela et al (7).

The Finnish healthcare and occupational healthcare system. The Finnish healthcare system has three parallel primary healthcare providers: municipalities, employers, and private healthcare companies. Most of the services are provided by tax-funded municipal healthcare centers. Patients have to pay modest fees for using these services (eg, €10.1 for a visit to the general practitioner). In addition, Finland has a compulsory social insurance system that reimburses the costs of private healthcare. Organizing occupational healthcare is compulsory for employers, who get about 50% of the costs reimbursed from the Finnish social insurance institution, Kansaneläkelaitos (KELA). Occupational healthcare services are available for employees without any charges. When using private health centers, patients get reimbursement from KELA, but they shoulder considerable costs themselves such as 70% of the costs of a visit to a medical specialist.

Occupational health professionals (physicians, nurses, physiotherapists, and psychologists) provide both preventive care and return-to-work support and general healthcare treatment. Occupational physicians, like all Finnish physicians, can refer patients to hospitals that are mainly public and tax-funded.

Dutch return-to-work intervention. Steenstra et al (8) evaluated a return-to-work program for workers with 2–6 weeks of sick leave due to back pain. A workplace intervention, a graded activity intervention, and their combination were compared to "care as usual". Here we only examined the results of the workplace intervention. The workplace intervention consisted of workplace modifications and case management and aimed at improving return-to-work rates at one year follow-up. The primary outcome (ie, the mean difference in the number of days it took to return to work between the workplace intervention and care-as-usual groups) was significantly different from 0 with -30.0 days (95% CI -51.3– -3.1). In the economic analysis, the direct and non-healthcare costs were measured based on retrospective data collection with a questionnaire. Costs related to production loss were excluded from the economic analysis of the sick leave data to avoid counting them twice. During follow-up, half of the participants of both the intervention and the control groups also participated in the graded activity program. Therefore, the costs of this intervention were also included in the economic analysis. At one year follow-up, and from the societal point of view, avoiding one day of sickness absence with the workplace intervention cost on average €19 extra compared to the costs of care as usual.

The Dutch case and occupational healthcare system. In the Netherlands, the healthcare costs are covered by obligatory private healthcare insurance, which we considered comparable to the Finnish tax-based system (9). Even though competition in healthcare is increasing, most of the costs are still regulated by the government and based on fixed prices. General practitioners are the gatekeepers of the healthcare system and are highly trusted by patients. Access to other healthcare facilities and providers is mainly through the general practitioner. A parallel private healthcare system hardly exists, but if one goes to see a private practitioner the costs are fully born by the patient. Occupational healthcare is mostly based on comprehensive occupational health services that employers are required to contract. Recently, this has been extended with the possibility to only contract one professional to support sick leave prevention and assistance. In practice, this is mostly the occupational health physician. Occupational healthcare is not integrated in the regular healthcare system. Prices for occupational healthcare are not regulated and all costs are paid by the employer. Occupational health physicians only provide return-to-work support and preventive services and are hardly involved in diagnosis and treatment. Usually, they do not refer patients to specialist or hospital care but rather first refer the patient back to the general practitioner.

Translating healthcare systems: resources used and costs

The Finnish intervention in the Netherlands. First we assessed how the Taimela et al (7) intervention could be realized in the Netherlands. We organized the resource use so that it better reflected the specific Finnish structure of healthcare. Then we judged how the healthcare services utilization in Finland would be provided in the Netherlands (see the two first columns of table 1).

We used the Dutch manual for cost research (10) to estimate Dutch costs issued by the Dutch Organization for Healthcare Charges (CTG) (table 2). Where these costs were not provided in the manual, such as for occupational physicians, we made an estimate based on findings from the internet.

We allocated costs to the employer based on the principle that he is responsible for occupational healthcare. For private healthcare, alternative medicine, and homecare, we allocated the costs to the employees. All other healthcare costs were allocated to tax-payers/health insurers. Hereafter, we use the term "tax-payers" to cover tax-payers in the Finnish system and the insured and the health insurers in the Dutch system.

In the original Finnish study, the costs of finding employees at risk were not included because only the intervention was evaluated and not the whole screening process. To be able to show the real costs to the employer, we made the following assumptions. We assumed the cost of a questionnaire sent to a cohort of 3115 employees to be €10 per employee. Therefore, the total costs to find 418 high-risk employees was €31 150 and the resulting cost per high-risk employee was €74.50.

The Dutch intervention in Finland. The Dutch intervention was first translated into Finnish healthcare system. We assumed that patients would consult general practitioners just as often as in the Netherlands. Consulting a medical specialist in the Netherlands was considered equal to an outpatient hospital visit in Finland. We recalculated the costs of the graded activity intervention and the workplace intervention based on the number of hours that were spent on the intervention in the Dutch situation but with Finnish prices. For the workplace intervention, we used 8 hours at €33.5/hour for the occupational health nurse, 8 hours at €50/hour for the supervisor and 1 hour at €147.6/hour for the occupational health physician. For the graded activity intervention, we calculated 20 hours at €33.5/hour for the physiotherapist. The unit prices for the intervention and other healthcare resources are based on the healthcare unit costs in Finland in year 2001 as described by Hujanen (11) and rehabilitation costs as described by KELA (12). The unit costs are expressed in euros at the 2004 level. We allocated

Table 1. Costs in euros (€) of prevention of sick leave intervention in the Netherlands for intervention (N=134) and control group (N=138) averaged per worker during 12 months follow-up and divided according to costs born by public funds, the employer or the employee and according to resource type. [I=intervention; C=control]

Original Finnish resource description	Translated Dutch resource use	Unit cost (€)	Resource use (total) number)		Allocation of average costs (€) per participant						Total cost (€)	
					Tax payers		Employer		Employee			
			I	C	I	C	I	C	I	C	I	C
Hospital care in-patient (days)												
University hospital	Days at university hospital	476.0	29	24	103.0	82.8	..	..	..	..	103.0	82.8
Central hospital	Days at general hospital	337.0	26	35	65.4	85.5	..	..	..	..	65.4	85.5
Regional hospital	Days in general hospital	337.0	5	24	12.6	58.6	..	..	..	..	12.6	58.6
Rehabilitation hospital	Days rehabilitation centre	336.0	55	69	137.9	168.0	..	..	..	..	137.9	168.0
Other hospitals	Days ordinary hospital	337.0	0	4	0.0	9.8	..	..	..	..	0.0	9.8
Hospital care out-patient (visits)												
Clinic university hospital	Out-patients university hospital	100.0	69	47	51.5	34.1	..	..	..	..	51.5	34.1
Clinic central hospital	Out-patients general hospital	56.0	49	30	20.5	12.2	..	..	..	..	20.5	12.2
Clinic in a regional hospital	Out-patient general hospital	56.0	29	53	12.1	21.5	..	..	..	..	12.1	21.5
Other hospital out-patient clinics	Out-patient general hospital	56.0	4	3	1.7	1.2	..	..	..	..	1.7	1.2
University hospital (no physician involved)	Out-patient university hospital	100.0	19	20	14.2	14.5	..	..	..	..	14.2	14.5
Central hospital (no physician involved)	Out-patient ordinary hospital	56.0	18	17	7.5	6.9	..	..	..	..	7.5	6.9
Regional hospital (no physician involved)	Out-patient general hospital	56.0	9	34	3.8	13.8	..	..	..	..	3.8	13.8
Other hospital (no physician)	Out-patient general hospital	56.0	7	2	2.9	0.8	..	..	..	..	2.9	0.8
Rehabilitation centre	Out-patient rehabilitation centre	83.0	9	15	5.6	9.0	..	..	..	..	5.6	9.0
Mental health clinic	Out-patient mental health hospital	124.0	8	10	7.4	9.0	..	..	..	..	7.4	9.0
Occupational healthcare					..	..						
Doctor visits	Visits occupational physician	75.0	419	495	..	..	234.5	269.0	..	..	234.5	269.0
Nurse visits	Visits occupational physician	75.0	296	235	..	..	165.7	127.7	..	..	165.7	127.7
Physiotherapist visits	Visits occupational physiotherapist	45.0	134	123	..	..	45.0	40.1	..	..	45.0	40.1
Costs of detecting "high risk workers"	Costs of detecting "high risk workers"	74.5	134	0	..	..	74.5	0.0	..	..	74.5	0.0
Other healthcare professionals visits	Visits occupational physician	75.0	60	46	..	..	33.6	25.0	..	..	33.6	25.0
Telephone health advice	Telephone consultation general practitioner	10.1	38	83	2.9	6.1	..	..	..	..	2.9	6.1
Municipal healthcare												
General practitioner visits	Visits general practitioner	20.2	67	76	10.1	11.1	..	..	..	..	10.1	11.1
Nurse visits	Visits general practitioner	20.2	36	46	5.4	6.7	..	..	..	..	5.4	6.7
In-patient days community health centre	In-patient days general hospital	337.0	6	0	15.1	0.0	..	..	..	..	15.1	0.0
Visits community health centre ward	Visits general practitioner	20.2	0	1	0.0	0.1	..	..	..	..	0.0	0.1
Private healthcare												
In-patient days private hospital	In-patients days general hospital	337.0	9	1	22.6	2.4	..	..	..	..	22.6	2.4
General practitioner visits	Visits general practitioner	20.2	18	36	2.7	5.3	..	..	..	..	2.7	5.3
Physiotherapist visits	Visits physiotherapist	22.8	272	236	46.2	38.9	..	..	..	..	46.2	38.9
Psychiatrist or psychologist visits	Private psychologist/ psychotherapist	76.0	6	75	..	..	..	..	3.4	41.3	3.4	41.3
Hospital visits	Outpatient clinic general hospital	56.0	1	3	0.4	1.2	..	..			0.4	1.2
Other consultant visits	Visits other private consultant	100.0	44	53	..	..	..	..	32.8	38.4	32.8	38.4
Orthopaedic consultant visits	Visits private orthopaedic consultant	100.0	26	32	..	..	..	..	19.4	23.2	19.4	23.2
Total costs (€) average per participant					551.4	599.5	553.3	461.8	55.6	102.9	1160.4	1164.3

Table 2. Costs in euros (€) of return to work evaluation in Finland for Intervention (N=96) and control group (N=100) averaged per worker during 12 months follow-up and divided according to costs born by public funds, the employer or the employee and according to resource type. [I=intervention; C=control; OHS=occupational health services]

Original Dutch resource description	Translated Finnish resources	Finnish unit price (€)	Resource use (average)		Allocation of average costs (€) per participant						Total cost (€)	
					Tax payers		Employer		Employee			
			I	C	I	C	I	C	I	C	I	C
Occupational health services												
Occupational physician (minutes)	Occupational physician	2.74	86.3	94.8	118.2	129.9	118.2	129.9	..	..	236.5	259.8
Graded activity	See text	670.00	0.26	0.29	87.1	97.2	87.1	97.2	..	..	174.2	194.3
Workplace intervention	See text	815.60	1	0	207.8	..	607.8	..	..	..	815.6	0.0
Hospital care												
Hospitalization (days)	Central hospital	451.60	0	0.4	0.0	174.1	..	..	..	6.5	0.0	180.6
Diagnostic tests	Average value used in the Netherlands	50.00	0.6	1	30.0	50.0	..	..	..	..	30.0	50.0
Medical specialist (visits)	Outpatient visit central hospital	183.20	0.5	0.9	81.5	146.7	..	..	10.1	18.1	91.6	164.9
Primary care												
General practitioner (visits)	General practitioner	65.60	1.2	1.5	66.6	83.2	..	..	12.1	15.2	78.7	98.4
Physiotherapist (visits)	Physiotherapist (OHS)	33.50	12.8	13.3	214.4	222.8	214.4	222.8	..	..	428.8	445.6
Manual therapist (visits)	Physiotherapist (outside OHS)	30.00	2.1	3.4	52.5	85.0	..	..	10.5	17.0	63.0	102.0
Mensendieck therapy (visits)	Physiotherapist (outside OHS)	30.00	1.8	2.2	45.0	55.0	..	..	9.0	11.0	54.0	66.0
Private care												
Professional home care (hours)	Home care	33.80	0.2	0	6.8	0.0	..	..	..	..	6.8	0.0
Alternative healthcare (visits)	Alternative care	30.00	1.1	0.5	..	..	..	..	33.0	15.0	33.0	15.0
Paid help (hours)	Paid help	8.00	2.5	4.1	..	..	..	..	20.0	32.8	20.0	32.8
Unpaid help (hours)	Unpaid help	8.00	59.6	59.3	..	..	..	..	476.8	474.4	476.8	474.4
Indirect costs												
Absence unpaid work (hours)	Unpaid work absence	8.00	241.8	245.8	..	..	..	..	1934.4	1966.4	1934.4	1966.4
Total costs (€) average per participant					909.9	1043.9	1027.5	449.8	2505.9	2556.4	4443.3	4050.1

the cost shares to employers, employees, and society according to their share in the funding of the services in Finland. A detailed description can be found in the appendixat the end of this article.

Incremental cost-effectiveness ratios after translating the intervention into another country

For the transfer of both studies, we calculated the ICER based on the estimated resources costs to society, employers, and employees according to the following calculation: ICER=ΔC/ΔE where ΔC = average costs in intervention group – average costs in control group and ΔE = average sick days in the intervention group – average sick days in the control group.

For ΔE, we used the same mean difference as used in the original projects and we assumed that these study results would be the same in the target country as in the original country. Because ICER that represent both a cost saving and a higher effectiveness are difficult to interpret, we also present the average cost difference between the intervention and the control group (table 3). For all calculations, we used a positive (+) ΔE (more sickness days avoided).

Results

In table 1, we present the results of the transfer of the Finnish sick leave prevention intervention to the Dutch situation and, in table 2, the results of the application of the Dutch return-to-work intervention to Finland.

In table 3, we present the influence on the ICER. We could not replicate exactly the results of the original studies even though we used the same figures for the resource use. This was due to both the rounding off of the figures for resource use and unclear calculation of the costs of diagnostic tests in the Dutch study.

After transfer to the target country, there were only slight differences in the ICER from the societal point of view. The incremental costs for the return-to-work intervention in Finland were on average about €4 lower and, for the sick leave prevention intervention in the Netherlands, €2 higher. For employers in the Netherlands, the Finnish sick leave prevention intervention was more costly because they do not benefit from the reduction in healthcare costs as the original Finnish employers did. For employees in Finland, the return-to-work intervention was more beneficial than for the original Dutch employees because of their co-payments in the Finnish healthcare system.

Table 3. Average costs differences in euros (€) and incremental cost-effectiveness ratios (ICER) from original studies, transferred to the other country and for various stakeholders. [Effect=one day of sick leave avoided].

	Sick days (mean difference)	Societal costs [a] (€)	Societal ICER (€)	Costs to tax payers [a] (€)	Tax payers ICER (€)	Costs to employer (€) [a]	Employer ICER (€)	Costs to employee [a] (€)	Employee ICER (€)
Return to work intervention									
Original – Netherlands	30	534.4	17.8	-237.2	-7.9	625.3	20.9	146.3	4.9
Transfer – Finland	30	393.2	13.1	-134.0	-4.5	577.7	19.3	-50.5	-1.7
Sick leave prevention									
Original – Finland	1.7	-75.2	-44.2	-54.7	-32.2	-6.4	-3.7	-14.1	-8.3
Transfer –Netherlands	1.7	-78.4	-46.1	-48.1	-28.3	16.9	10.0	-47.3	-27.8
Sick leave prevention (including screening costs)									
Original – Finland	1.7	-0.7	-0.4	-54.7	-32.2	68.1	40.1	-14.1	-8.3
Transfer –Netherlands	1.7	-3.9	-2.3	-48.1	-28.3	91.4	53.8	-47.3	-27.8

[a] Intervention – control.

Cost allocation revealed that from the tax-payers' and the employee's perspectives, both interventions represented a cost saving in both countries except for the original Dutch employees. For the employers, however, both interventions were more costly in both countries except for the employers in the original Finnish study. (Details of the cost allocation of the original studies not shown except for ICER in table 3)

For the sick leave prevention study, it made a considerable difference for employers whether the cost of screening to find employees at high risk was included, while – from the societal point of view – the intervention still represented a cost saving.

Discussion

We found that transferring the results of a cost-effectiveness study from one country to another is possible and that the ICER from the societal point of view were only marginally different. The costs for employers and employees were higher in the Netherlands than in Finland due to fewer co-payments in the Dutch healthcare system. In the case of both return-to-work and sick leave prevention, the interventions represented a cost saving for tax payers while employers bore most of the costs. We had most difficulties in assessing which resources would correspond between countries.

The strength of this case study is that it shows the possibilities and limitations of transferring the results of cost-effectiveness studies between countries. The authors were familiar with both countries and could translate the contents of the originating intervention into the context of the target country.

One of the limitations of our study is that we were unable to incorporate all variables that influence transferability into our case studies. Macan et al (13) list patient, clinician, healthcare system, and wider socio-economic factors as the four main groups that can influence both the effectiveness and the costs of an intervention.

For patient factors, we require a better understanding of the influence of baseline sick leave rate and other risk factors for sick leave in Finland and the Netherlands. Sick leave is a phenomenon that involves many cultural and behavioral factors. In a recent Cochrane review of physical conditioning interventions, the authors found great variation in the outcomes of the trials in various countries, which they labeled as contradictory (14). The the effects of clinicians and the healthcare system on the intervention are also not very well known. Prevention of sick leave in the Finnish intervention was mainly realized through occupational health services and the healthcare system, to which the occupational physicians had easy access. That would be much more difficult to organize in the Netherlands, where the occupational physicians are not very well integrated into the healthcare system. We also assumed that patients in Finland would visit their general practitioners equally often as in the Netherlands, which probably is not the case. In Finland, half of the visits to primary-care physicians take place in occupational healthcare. We would need additional data about the process and outcome of the intervention in the target country to be able to take these factors into account. The next step would be to make a proper decision analytical model and also take parameter uncertainty into account (6).

We used the data as presented in the articles on the original studies. However, it can be argued if the inclusion of various costs is appropriate. For example, Steenstra (8) included costs for foregone unpaid voluntary activities, such as volunteer work and educational activities. This amounted up to about half of the total costs involved. We feel that this is an overestimation and not fully realistic. For the Finnish sick leave preven-

tion intervention, the costs of all participants of the trial were estimated by imputation of the missing data. This revealed that the costs were lower while the effects were higher. We would however have to go back to the individual patient data to be able to take this into account.

ICER are difficult to interpret especially when the intervention saves more cost and is more effective than the alternative as in the case of Taimela et al (7) and as discussed by Drummond (4). The problem is that the highest combination of cost saving and effect gain does not necessarily translate into the best ICER. Taimela et al report for example two different ICER, one that saves €43 per sick day avoided and another that saves €17 per sick day avoided. These were based on respectively €-80/-1.7 sick days and €-180/10.8 sick days. It is clear that the latter outcome is to be preferred over former. Some argue that ICER are inherently misleading and do not provide good tools for decision-making (15).

A budget impact analysis has been advocated as a better tool for decision-makers (16). However, in the case of firms, the costs of sick leave and measures to prevent sick leave are not very well visible as budgets. It would, however, be worthwhile to develop further methods for such a budget impact analysis for occupational health interventions. In the Netherlands, where the costs of the first two years of sick leave are completely born by the employers, an investment of €54 to prevent one day of sick leave will probably be attractive. The costs of productivity loss have been calculated at €35 per lost working hour for 2003 (10). These figures could be used to develop a good business case (17, 15). For employers in Finland the incentives to invest in the intervention are somewhat less as the majority of costs of sick leave are fairly quickly born by KELA. In a recent review of other occupational health interventions, the median investment in the intervention was of €214 per worker (17). Compared to this sum, the investments needed for the interventions here are only modest.

It is a surprising finding that decreasing sick leave at the same time decreases healthcare costs, and that interventions that reduce sick leave can also result in cost savings for healthcare insurers.

These case studies stress once more that proper reporting is very important to enable the use of the results in other countries. A proper description of the intervention and the resource use is paramount. With this in mind, we conclude that it is possible to transfer the results of cost-effectiveness studies to other jurisdictions even though there is still a great deal of uncertainty about the results due to difficulties in translating the system, finding the costs of the resources, and assessing the effectiveness in another country. Modeling studies would be helpful to examine which variables, other than resource use, influence the transfer of cost-effectiveness studies that use sick leave as the outcome. Further research is needed to be able to translate the results of cost-effectiveness studies into a budget impact analysis.

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Appendix. Allocation of healthcare costs in euros (€) in Finland. [OHS=occupational health services]

Resource	Cost (€)	Total costs (%)		
		Tax-payers' share	Employers' share	Employees' share [a]
Hospital care in-patient (days)				
University hospital	636.1	96.4	..	3.6
Central hospital	451.6	95.0	..	5.0
Regional hospital	179.8	87.4	..	12.6
Rehabilitation	112.7	92.5	..	7.5
At other hospitals	510.2	95.6	..	4.4
Hospital care out-patient (visits)				
Clinic in a university hospital	202.8	90.0	..	10.0
Clinic in a central hospital	183.2	89.0	..	11.0
Clinic in a regional hospital	179.8	88.8	..	11.2
Other hospital out-patient clinics	191.2	89.4	..	10.6
University hospital	30.9	100.0	..	..
Central hospital	30.9	100.0	..	..
Regional hospital	30.9	100.0	..	..
Other hospital	6.0	100.0	..	..
In-house rehabilitation centre	13.2	100.0	..	..
Mental health clinic	108.1	100.0	..	..
Occupational healthcare				
Doctor visits in OHS	41.2	50.0	50.0	..
Nurse visits in OHS	22.7	50.0	50.0	..
Physiotherapist visits in OHS	49.7	50.0	50.0	..
Cost per worker to detect "high risk" employees	74.5		100.0	..
Visits at other healthcare professionals in OHS	33.9	50.0	50.0	..
Telephone health advice	17.4	50.0	50.0	..
Municipal healthcare				
General practitioner visits in public healthcare	65.6	84.6	..	15.4
Nurse visits in public healthcare	30.5	100.0	..	..
In-patient days at community health centre	148.0	84.7	..	15.3
Physiotherapist visits outside OHS	30.0	83.3	..	16.7
Visits at community health centre ward	6.0	100.0	..	..
Private healthcare				
In-patient days at private hospital	510.2	30.0	..	70.0
General practitioner visits in private healthcare	57.9	30.0	..	70.0
Visits at private psychiatrist or psychologist	88.1	30.0	..	70.0
Visits at private hospital	13.2	30.0	..	70.0
Visits at other private consultant	79.6	50.0	50.0	..
Visits at private orthopaedic consultant	121.0	50.0	50.0	..

[a] Employees share is based on the co-payments that vary by healthcare resource.