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# BMJ Open

## **iLead- Evaluation of a generic implementation leadership intervention: A mixed method pre-post intervention design**

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# iLead- Evaluation of a generic implementation leadership intervention

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## 1 **Abstract**

2 **Objectives:** The present study is an evaluation of the iLead intervention. We also investigate  
3 whether or not transfer of training can be supported by contextualizing the intervention  
4 (recruiting all line managers from one branch of the organization while focusing on one  
5 implementation case, as well as training senior management).

6 **Design:** A pre-post evaluation design was applied using mixed methods with process and  
7 effect surveys and interviews to measure the effects on three levels.

8 **Setting:** Healthcare managers from Stockholm's regional healthcare organization were  
9 invited to the training.

10 **Participants:** 52 line managers participated in the iLead intervention. Group 1 consisted of  
11 21 managers from different organizations and with different implementation cases. Group 2,  
12 representing the contextualized group, consisted of 31 managers from the same organization,  
13 working on the same implementation case, where senior management also received training.

14 **Intervention:** iLead is an intervention where healthcare managers are trained in  
15 implementation leadership based on the full range leadership model (FRLM).

16 **Primary outcome measures:** Reactions, knowledge and implementation leadership are  
17 measured.

18 **Results:** Quantitative and qualitative analyses indicate that iLead was perceived to be of high  
19 quality and capable of increasing participants' knowledge. Mixed effects were found  
20 regarding changes in behaviors. The contextualization did not have a boosting effect on  
21 behavior change. Hence, group 2 did not increase their active implementation leadership in  
22 comparison to group 1.

23 **Conclusion:** iLead introduces a new approach to how implementation leadership can be  
24 trained when knowledge of effective leadership for implementations is combined with  
25 findings on the importance of environmental factors for the transfer of training. Even though

1 managers reported general positive effects, transfer was not facilitated through the  
2 contextualization of the intervention. There is a need to further develop approaches to help  
3 participants subsequently apply the learned skills in their work environment.

4  
5 **10 Keywords:** contextualization, full-range leadership model, implementation leadership  
6 training, intervention, contextualization, organizational development  
7

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## 1 **Strengths and limitations of this study**

- 2 -The present study is based on a rigorous evaluation process of the iLead intervention using  
3 mixed methods, where the quantitative evaluation method is followed up by interviews to get  
4 a deep understanding of the effects.
- 5 -Effects of the iLead intervention are measured on different levels based on a thorough  
6 theory-based evaluation plan.
- 7 -Effects of the iLead intervention are, in addition to self-reports, measured through employee-  
8 ratings, where employees report on their managers' implementation leadership related to a  
9 current implementation.
- 10 - Multilevel modelling is applied to account for the nestedness of data, which is the case for  
11 longitudinal data.
- 12 -Drop out was more prominent in one intervention group and the response rate decreased over  
13 time.

## 1 **Background**

2 Implementing the ever-growing number of evidence-based methods into practice is an  
3 integral part of daily work in healthcare organizations. For implementation to be successful,  
4 leadership has been identified as a central factor [1–10]. However, many managers lack  
5 formal training in leadership and leading change, as they have often been promoted for their  
6 work as front-line providers [cf. 11]. In addition, existing studies on leadership during  
7 implementation have often lacked a theoretical underpinning [4–6,12], which prevents  
8 knowledge about how and why leadership is important for successful implementation.  
9 Accordingly, there is little research on how to train managers in leadership that facilitates the  
10 implementation process [e.g., 5]. Whereas there is some evidence for the effectiveness of  
11 training leaders in implementing evidence-based practice (e.g., EBP [13]) or specific  
12 evidence-based methods (e.g., preventing diabetic foot ulcers [14]), little is known about how  
13 to train generic implementation leadership, a skill that is needed when leaders are expected to  
14 lead multiple simultaneous implementations as part of their daily work. The present study is  
15 an evaluation of the “iLead” intervention that aims to train managers in generic  
16 implementation skills [15] answering to calls highlighting the need to provide and evaluate  
17 trainings directed at individuals in implementation roles and therefore focusing on  
18 implementation practice [16,17].

## 19 **The iLead intervention**

20 A large amount of leadership research has been based on the full-range leadership model  
21 (FRLM) [18,19] that describes both desired active leadership behaviors (i.e., transformational  
22 leadership and contingent reward) and undesired passive behaviors (i.e., management by  
23 exception and laissez faire). Active leadership has been related to positive organizational and  
24 employee outcomes [7,20–24] and fostering change [7,9,25]. Even though the FRLM has only  
25

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2  
3 1 been used in a few studies that investigated implementation [e.g., 13], systematic reviews  
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5 2 have identified leadership activities important for implementation that map well on the active  
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7 3 leadership behaviors of the FRLM [5,6,10,26]. Based on this work, the FRLM was used in the  
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9 4 iLead intervention [for the study protocol, see 15].  
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## 14 6 **Fostering transfer through a supporting organizational context**

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17 7 Even though leadership development in general has been found to result in positive effects  
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19 8 [7,27,28], it has been acknowledged that these often are limited to proximal outcomes such as  
20  
21 9 reactions and knowledge [27,29]. Only 10% of training expenditure has been estimated to  
22  
23 10 translate to behavioral change [30]. This highlights the transfer gap—the difficulty in  
24  
25 11 translating knowledge and skills to the work setting [31]. Three primary factors influence the  
26  
27 12 transfer of training: trainee characteristics, intervention design and delivery, as well as the  
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29 13 post-training work environment [32]. Trainee characteristics include personality, the  
30  
31 14 motivation to participate and existing skills, whereas intervention design and delivery defines  
32  
33 15 the objectives of the training and the applied pedagogical methods that are used to bring about  
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35 16 skills. The post-training work environment refers to the organizational context of participants,  
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37 17 such as social support, transfer climate and the opportunity to perform and follow up of the  
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39 18 new skills. Even though trainee characteristics could be used for the selection of participants,  
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41 19 this is often not possible in practice; hence, the intervention design and the post-training work  
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43 20 environment are factors that can be proactively tackled by interventionists to leverage transfer  
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45 21 [cf. 33]. Therefore, in designing the iLead intervention, pedagogical tools to facilitating  
46  
47 22 transfer were focused on (i.e., how the iLead workshops were brought about) (see upper part  
48  
49 23 of table 1). Moreover, a feature that sets iLead apart from other interventions is its effort to  
50  
51 24 further foster transfer by incorporating a contextualized intervention group to also manipulate  
52  
53 25 the training work environment. Here senior management and all line managers from one  
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1 organizational branch participated in the training and worked on the same implementation  
 2 case (see lower part of table 1). Involving senior management is important as they not only  
 3 allocate resources and have the power to restructure processes and structures to make the  
 4 implementation work [34], they also generate and help maintain managers' and employees'  
 5 commitment [35] and compliance with an intervention [36].

6  
 7 \_\_\_\_\_ Table 1 about here \_\_\_\_\_

8  
 9 Table 1. Intervention design and post training work environment factors to facilitate transfer  
 10 of training and the operationalization in the iLead intervention

	<b>Facilitators for transfer of training</b>	<b>Elements in the iLead intervention</b>	<b>Intervention group</b>
Intervention design	Behavioral modeling	Role play, planning their actions and practicing between workshops	1 & 2
	Error management	Role play, practicing between workshops and revising the action plan, one workshop on handling resistance and continuous problem solving	1 & 2
	Realistic training environment	Working on an ongoing implementation, practicing between workshops, examples from health care in the workshops	1 & 2
	Peer and supervisor support	All line managers from one organization, in addition to a senior manager intervention	2

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2			
3	Transfer climate	Interventions on different levels in the	2
4		organization to create a shared mental model	
5		about implementation	
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10	Opportunity to	One common implementation and the support	2
11	perform	of senior management to create alignment and	
12		direction	
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17	Follow up	One common implementation and the support	2
18	structure	of senior management to create alignment and	
19		direction	
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22	env	irc	
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## 1 **The present study**

2 The overall aim of this study is to examine the primary outcomes of iLead, an intervention  
 3 based on the FRLM [18,19] to train healthcare managers' generic implementation leadership.  
 4 Based on Kirkpatrick's four-level evaluation model [37], four questions are addressed with a  
 5 mixed-method evaluation:  
 6

- 7 1. How do managers perceive iLead?
- 8 2. Does iLead increase managers' knowledge related to implementation leadership?
- 9 3. Does iLead increase managers' skills in leading a current implementation?

10 Furthermore, we investigate under which conditions the iLead intervention has greater impact  
 11 by studying the contextualization of the intervention. Thus, two intervention conditions were  
 12 compared: an individualized group (group 1) and a contextualized group (group 2). We expect  
 13 no difference between the intervention groups regarding to their reactions and learning  
 14 because both groups were exposed to the same intervention content and pedagogy. In  
 15 contrast, we expect that contextualization (group 2) will facilitate the transfer of training  
 16 resulting in the fourth question:

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3 1 4. Does iLead lead to in a larger change of the behavioral outcome, i.e. generic  
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5 2 implementation leadership, in group 2?  
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#### 10 4 **Method**

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12 5 A mixed-methods pre-post evaluation approach was applied with a two-armed, non-  
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14 6 randomized intervention design in which managers—based on their organizational  
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16 7 belonging—were assigned to one of the two intervention groups.  
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#### 19 9 **Setting and participants in the intervention**

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22 10 Healthcare managers from Stockholm’s regional healthcare organization were invited to  
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24 11 participate in an implementation leadership training. More detailed information about the  
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26 12 recruitment process can be found in the study protocol [15]. In total, 52 managers participated  
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28 13 (see table 2). Group 1 consisted of 21 managers from different branches of the healthcare  
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30 14 organization who work with different implementation cases during the intervention. Group 2  
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32 15 consisted of 31 managers from one division of the regional healthcare organization, where  
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34 16 senior management made participation in the training mandatory. With some exceptions, line  
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36 17 managers worked with the same implementation case.  
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\_\_\_\_ Table 2 about here \_\_\_\_

Table 2. Descriptive statistics of managers in the two intervention groups

	Intervention group 1 (individualized group)	Intervention group 2 (contextualized group)
Number of participants	21	31
Total attrition	11	4

## Dropout

– Before the start of the intervention	3	2
– After WS1/2	3	1
– After WS3	1	1
– After WS4	1	-
Women	92.3%	96%
Age	50 (9.1)	50.8 (8.3)
University education	73.3%	81.3%
Years being a manager	3.3 (2.09)	4.4 (3.9)
Number of employees	25.15 (12.70)	21.83 (7.78)

Notes: means and standard deviations are presented for age, years as managers and number of employees.

The two groups of managers had similar demographic characteristics, which are representative of employees in the Swedish healthcare sector [38] (see table 2). Attrition was greater for group 1 (for details and time of drop out see table 2). On average, managers from group 1 participated in three out of the four training occasions (SD=.84), whereas managers from group 2 participated on 3.5 occasions (SD=.79).

### Intervention

The iLead intervention consists of five half-day workshops, which were provided at four occasions. The intervention content was the same for intervention groups 1 and 2. More detailed information about the development and content of iLead can be found in the study protocol [15].

## 1 Patient and public involvement

2 Important stakeholders (national experts, senior and line managers) were involved in co-  
3 creating the intervention to ensure a good fit between iLead and the healthcare context and the  
4 participants' needs [39]. Patient's involvement was not applicable in this study.

## 6 Data sources for the evaluation

7 A sequential exploratory design was used [40]. Quantitative surveys were conducted prior and  
8 twice after the intervention followed with qualitative interviews to enhance our understanding  
9 of the training impact. Shorter process evaluation surveys were also conducted after each  
10 individual workshop. To strengthen the research design, the participating managers, as well as  
11 their employees, were included in the data collection.

12 Table 3 shows response rates for the effect and process evaluations. Response rates decreased  
13 over time, which is common in longitudinal studies [41].

15 \_\_\_\_\_ Table 3 about here \_\_\_\_\_

17 Table 3. Response rates for managers and employees

	Process evaluation (manager data)				Effect evaluation (employee data)		
	WS1/2	WS3	WS4	WS5	Pre-test	Post-test 1	Post-test 2
Group	15/18	10/15	8/14	10/10	252/477	160/368	132/268
1	(83.3%)	(66.6%)	(57.1%)	(100%)	(52.8%)	(43.4%)	(49.2%)
Group	26/29	23/28	22/27	22/27	432/607	313/562	292/544
2	(89.5%)	(82.1%)	(81.4%)	(81.4%)	(71.1%)	(55.6%)	(53.6%)

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3 1 Nine individual semi-structured interviews were conducted by a researcher who was not  
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5 2 involved in the intervention. The interview guide was developed based on Kirkpatrick's  
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7 3 evaluation model and Baldwin and Ford's transfer of training model [32,37] (for the interview  
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9 4 guide, see appendix). Interviews, which lasted for approximately one hour, took place at the  
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11 5 respondents' work places and were recorded and transcribed verbatim by an external  
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13 6 transcription service.  
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### 19 8 **Measures in the process evaluation and pre-post effect evaluation surveys**

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21 9 Measurements are described in Table 4.  
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26 11 \_\_\_ Table 4 about here \_\_\_  
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Table 4. Constructs in the process evaluation and pre and post intervention surveys

Research question	Construct	Content	No. of items	Response alternatives	Reference	Time of measurement	Cronbach's alpha
<b>Process evaluation (manager data)</b>							
1	Appraisal of the intervention as a whole	Complexity, relevance, novelty, valence involvement	10	ten-point continuum for each adjective pair	[42]	WS5	.81 .68 .84 .60 .29
2	Knowledge about implementation and		6	1 (strongly disagree) - 10 (strongly agree)	specially constructed to match	WS1/2, WS3,	.90 .97

1

1							
2							
3	implementation leadership			agree)	the iLead	WS4,	.93
4							
5					intervention	WS5	.97
6							
7							

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**Pre and post intervention surveys (employee data)**

9							
10							
11	3	Changes in implementation and leadership	Extent of perceived changes in the implementation of the new method as well in the manager’s leadership during the last six months	2	1 (big impairment) - 5 (no change) to 10 (great improvement)	[43,44] T2 T3	.79 .74
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26	4	Active implementation leadership	Leadership behaviors in line with FRLM related to the implementation	13	1 (strongly disagree)- 5 (strongly agree)	[45] T2 T3	.95 .96
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Notes: WS= workshop, T2= post measure 1, T3= post measure 2

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## 2 **Analyses**

3 Multilevel modeling was used to analyze data based on three or more repeated measurements  
4 to account for the hierarchical nature of the data [46]. Two-level models with the repeated  
5 measure at the first level and the individual person at the second level—the individual  
6 employee at the first level and the group belongingness at the second level, respectively—  
7 were constructed. Nested models were compared by using full maximum-likelihood  
8 estimation [46]. Time was centered on the baseline, respectively WS1/2, whereas the group  
9 remained uncentered (0=intervention group 1, 1=intervention group 2). The multi-level  
10 models were run in Mplus 7.2, whereas all other analyses were conducted in SPSS 24.

11  
12 Interviews were analyzed using thematic data analysis [47]. A semantic approach was used,  
13 (i.e., the explicit meaning of the data was analyzed). Patterns in the narrative material that  
14 captured something important in relation to the above-outlined evaluation models were  
15 selected [32,37]. Next, the themes were reviewed by the research team. A few themes were  
16 revised or excluded because they overlapped with other themes or were less prevalent (raised  
17 by less than three respondents).

## 18 19 **Results**

### 20 21 **Reactions to the intervention**

22 Participants were satisfied (ratings over 7) with the training's complexity, relevance, valence,  
23 their involvement and the novelty of the content. No group differences were found (see table  
24 5), which is in line with our expectations. The quantitative results were strengthened by  
25 interview data (for quotes, see the bottom of table 5). In the analysis two themes emerged.

1 First, managers emphasized that they were able to work hands-on with their implementation  
 2 cases, which differed from other trainings they had attended (Quote 1). Moreover, they  
 3 highlighted the usefulness of the action plan guiding their implementation work during the  
 4 iLead intervention, which made their intuitive knowledge of the implementation process more  
 5 explicit (Quote 2) and helped them clarify the implementation for employees. Secondly, the  
 6 use of role play was perceived to be influential on the managers' development and  
 7 understanding (Quote 3).

8  
 9 \_\_\_ Table 5 about here \_\_\_

10  
 11 Table 5. Reactions to the intervention and related quotes

	Complexity	Relevance	Valence	Involvement	Novelty
Group 1	9.15	9.35	9.15	8.85	7.85
Group 2	8.52	9.06	8.63	8.56	7.09
Difference	$t_{(30)}=.99$	$t_{(30)}=.58$	$t_{(30)}=.90$	$t_{(30)}=.55$	$t_{(30)}=1.63$

Notes: independent t-test did not reveal significant differences between the two groups

#### Interview quotes

Quote 1 ID7: What has been the best, and most beneficial, for me was to be very concrete. Often when participating in various kinds of education programs, you get a theoretical top-up in some way, and then there is usually another step where you as a participant need to think about how to work with this in your practice alone. It is pretty easy to get stuck in this process and fail to follow through... //

Quote 2 ID 9: ...when I got to see this training, I felt that I was pretty good at implementation, simply out of experience. I have learned through experience.

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2  
3 But what I haven't done is a structured implementation action plan, previously  
4  
5 I had gone through the steps only in my head. This structured process plan, I  
6  
7 feel...will give me an enormous strength in the future.  
8  
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10 Quote 3 ID2: Yes, I really appreciated those exercises, both when we were to give a  
11  
12 talk [about our implementation case] and catch the others' interest, and then  
13  
14 this exercise where there was a challenge...where there was a group that had  
15  
16 been told to have different opinions [about the implementation case] and then  
17  
18 a manager tried to handle that. // I think that was very valuable. Role plays  
19  
20 and when you get to practice with each other, that helped me a lot.  
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26 **Improvements in implementation leadership knowledge**

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28 3 Managers from both intervention groups reported an increase in knowledge about  
29  
30 4 implementation and how to lead this process (see Table 6), which is in line with our  
31  
32 5 expectations. In the interviews, managers expressed increased knowledge concerning  
33  
34 6 implementation leadership as a generic skill, the structure and the iterative nature of the  
35  
36 7 implementation process (see Table 6, Quote 4 & 5) and the possibility to lead an  
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38 8 implementation decoupled from knowledge about the specific content of the implementation  
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40 9 (Quote 6).  
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11 \_\_Table 6 about here \_\_

13 Table 6. Multilevel models predicting change in knowledge and related quotes

	Knowledge		
	Model 1	Model 2	Model 3
Intercept	6.92*	5.97*	6.37*

Time		.41*	.42*
Group			-.62
$\sigma^2_{\text{within}}$	1,39*	1,10*	1,10*
$\sigma^2_{u0}$	1,12*	1,20*	1,11*
$-2*\log(\text{lh})$	497.62	474.3	471.8
df	3	4	5
$\Delta^{-2*\log(\text{lh})}$		23.3*	2,5
$\Delta_{\text{df}}$		1	1

Note: Table entries represent unstandardized parameter estimates. Individual level: N =128-140; group level: N =42. Time is centered at WS1/2, intervention group is coded 0=intervention group 1 and 1=intervention group 2, \*p<.05.

#### Interview quotes

Quote 4	ID9: ... I have become more conscious and more structured concerning what I need to think about when working through the different steps [of the implementation], and also the clarification of what behavior it is that I want to change.
Quote 5	ID1: It is not a failure that it didn't go well... //...like, okay, we tried something, oh well—let's try again, and in this way you can proceed. So, it [the action plan for the implementation] is not finished when you launch it.
Quote 6	ID7: //...the <i>leading</i> aspect is somehow something you can learn; to implement something new without having to have deep knowledge of the particular [implementation case]...then I can feel more confident in managing restructurings. //...previously when I have been manager and implemented quality registries...//...I think I lost myself in the content [of the implementation] in some way...//

## Improvements in implementation leadership behavior

When reviewing the last six months, employees experienced an improvement in implementation and their manager's leadership practices. No difference was found between the intervention groups (see Table 7, left side). Active implementation leadership at T2 did not differ between groups nor did group 2 have a steeper increase in implementation leadership between T2 and T3 (see Table 7, right side).

\_\_Table 7 about here\_\_

Table 7. Multilevel Estimates for Models predicting implementation leadership (employee ratings)

	CP T2		CP T3		AIL T2		AIL T3	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Intercept	6.10*	.636*	5.93*	3.36*	3.76*	3.70*	3.64*	.97*
CP <sup>a</sup> /AIL <sup>b</sup> T2	-		-	.42* <sup>a</sup>	-		-	.73* <sup>b</sup>
Group		-.42		.06		.10		-.12
$\sigma^2_{\text{within}}$	2.63*	2.64*	2.65*	2.33	.65*	.65.23*	.62*	.35*
$\sigma^2_{u0}$	.09	.04	.51*	.39	.24*		.60*	.18*
-2*log(lh)	660.67	658.3	728.4	645.6	436.74	426.5	486.46	336.0
df	3	4	3	5	3	4	3	5
$\Delta^{-2*\log(\text{lh})}$		2.4		82.8*		.2		150.5*
$\Delta_{\text{df}}$		1		2		1		2

Note: unstandardized coefficients, CP= Changes in leadership procedures, AIL= Active implementation leadership, \*p<.05.



1 To sum up, employees experienced a positive change in both the implementation process and  
 2 their manager's leadership practices, but no difference between groups could be found  
 3 regarding an increase in active implementation leadership. Interviews provided a deeper  
 4 insight in what participants perceived as particularly valuable and provide examples on  
 5 altered ways of leading implementations. However, the boosting effect of the  
 6 contextualization, which should facilitate a transfer of training for group 2, was absent. It  
 7 became clear that varying attitudes toward the common implementation case (Table 8, quotes  
 8 7), the timing of the iLead intervention in relation to a concurrent major organizational  
 9 change (Table 8, quotes 8) and a perceived lack of support from senior management and peers  
 10 (Table 8, quotes 9) may have mitigated the impact that the contextualization had on the  
 11 outcomes.

12  
 13 \_\_ Table 8 about here \_\_

14  
 15 Table 8. Quotes related to the contextualization

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Interview quotes

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Quote 7 ID11: It was in the midst of this reorganization when managers were dealing  
 with crying employees who were going to be transferred and so on. And then  
 one was asked to focus on implementing the new [common] program. There  
 must have been a lot of other cases that we could have implemented that  
 would have been more appropriate to implement at this moment in time...

Quote 8 Id 7: I think that it was unfortunate that we were in the midst of the  
 reorganization while the training program was simultaneously running. I think  
 that it was very interesting to participate in the training and that it is very  
 important for all of us to do this. However, I think that employees may have

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3 been in a slightly different mindset as a result of the reorganization, and were  
4 more concerned about how things would change in their daily job (e.g., who  
5 they were going to collaborate with later that year, what unit they would  
6 belong to, etc.). Change happens, but on this scale – once in a decade, maybe,  
7 so it is not very often..

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14 Quote 9 ID14: I feel that they [the senior management] have not been able to fully  
15 handle the situation [with supporting line managers as part of the training],  
16 which I believe—yet again—is the result of the timing. If it was not for the  
17 reorganization that was occurring in the midst of everything, then I think the  
18 senior management would have focused more on supporting us.  
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28 **Discussion**  
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31 3 This study focuses on the outcomes of iLead, an intervention training healthcare managers'  
32 generic implementation leadership. Results showed that managers perceived the content, as  
33 4 well as the pedagogy of the intervention, to be relevant and of high quality. Moreover, they  
34 5 perceived that their knowledge about implementation leadership had increased throughout the  
35 6 intervention. However, behavioral effects were mixed. The employee transition ratings on the  
36 7 progress regarding the implementation and the leading of it indicated an improvement, which  
37 8 also the interviews showed, where managers talk about altered ways of thinking about  
38 9 implementation and how to lead it. Despite our attempt to facilitate transfer by  
39 10 contextualizing iLead, by offering interventions to both line and senior managers from one  
40 11 organization and working on the same implementation case, no difference between the two  
41 12 intervention groups in implementation leadership or its increase over time could be found.  
42 13 According to previous literature transfer of training may be facilitated when there is a  
43 14 common understanding about implementation, alignment across hierarchical levels and social  
44 15

1 support among colleagues and from senior managers [34–36,48]. The interviews with  
2 managers provided insight into why the contextualization of iLead might not have resulted in  
3 the anticipated boosting effect. First, managers' attitudes regarding the common  
4 implementation case were mixed. Some embraced it, others were opposed to it, and that had  
5 been so for a long time: The implementation had been ongoing for some years with several  
6 setbacks. The fact that senior management made it mandatory to focus on this specific  
7 implementation case in the iLead intervention caused frustration. Thus, it seems likely that the  
8 readiness for the implementation case differed between the intervention groups; possibly  
9 managers in group 1, who were free to choose their implementation case, experienced higher  
10 readiness for their implementation case than managers from group 2, who were expected to  
11 work with a particular implementation. This may have decreased the managers' ability to  
12 make the most out of the exercises in the iLead intervention, which resulted in reoccurring  
13 discussions about the feasibility of the implementation case in the workshops for group 2.  
14 This presents the challenge of separating attitudes and experiences of the leadership training  
15 and its contextualization from the attitudes and experiences of the implementation case.  
16 Nevertheless, it also points toward the importance of the fit between perceived needs of the  
17 organization and the evidence-based practice that is implemented [e.g., 2,49,50]. Hence, even  
18 when the focus of an intervention is on implementation leadership such as iLead, rather than a  
19 specific evidence-based practice [e.g., 13,14], it may still be necessary to offer support to the  
20 organizations and participating managers to ensure the feasibility of the implementation case  
21 before accepting participants for this kind of intervention.

22 Second, major organizational change concurrently occurred with the intervention. In group 2,  
23 managers described conflicting focus, both for themselves and for employees, who in some  
24 cases were to change teams. However, managers from group 1 also experienced  
25 organizational changes, yet they reacted differently. They mentioned the changes, but did not

1 pay as much attention to them, nor did they describe them as a major hindrance in  
2 participating in the intervention and conducting the implementation. However, in group 1,  
3 attrition was higher, which might indicate a conflicting focus. The impact of line managers'  
4 attitudes toward the common implementation and the timing of the iLead intervention and  
5 organizational change in group 2 may be elucidated by research on mental models [34].  
6 Mental models concern underlying psychological beliefs, which affect participants' reactions  
7 and behaviors. Even though the quantitative evaluation of the iLead intervention revealed  
8 positive reactions, the interviews indicated mixed—in some cases, critical—beliefs regarding  
9 the implementation case and the timing of the organizational change. For an intervention and  
10 its implementation to be effective, the participants should believe that there is a problem that  
11 the intervention is suitable to address, which motivates them to participate in the intervention  
12 activities [51]. Whereas no difference in intrinsic motivation to participate in iLead was found  
13 between the two intervention groups, extrinsic motivation was higher in group 2 (analysis can  
14 be obtained from the authors). This is possibly a consequence of senior management making  
15 the training mandatory for line managers. Third, when whole organizations undergo an  
16 intervention, the group dynamics and existing organizational culture is brought into the  
17 intervention. Consequently, skeptical or conflicting mental models about the intervention can  
18 receive more attention and need to be addressed. For example, for group 2, workshop leaders  
19 had to spend more time on managing issues that originated from the organizational context  
20 (e.g., the skeptical attitude toward the common implementation case). In addition, in the  
21 contextualized group senior management took part in an intervention of their own, aiming to  
22 support line managers. However, this support was only partly perceived by line managers.  
23 Even though senior management themselves developed through this intervention [for more  
24 information, see 52], it did not result in a dialog between line and senior management to  
25 create alignment between organizational levels. The timing of the senior management

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3 1 intervention in relation to line managers' intervention may have been suboptimal. Important  
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5 2 discussions that would have had the potential to facilitate the implementation process, if  
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7 3 issued earlier, emerged among senior management during their intervention. More preparation  
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9 4 time to define the implementation case and senior management's role in supporting line  
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11 5 managers in their implementation process might have been beneficial and should be adjusted  
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13 6 in future multi-level interventions [52]. In sum, although contextualization may theoretically  
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15 7 have several benefits, such as providing social support, direction and alignment of the  
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17 8 implementation to boost transfer, this study highlights several impeding factors that may have  
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19 9 outbalanced these potentially beneficial effects. A more thorough organizational analysis  
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21 10 prior to the intervention to identify barriers for the intervention and the implementation case is  
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23 11 recommended. Hence, the general implementation and group climate, the history with the  
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25 12 implementation case and the structure and opportunities to perform in line with the  
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27 13 implementation should be investigated, along with participants' capacity and readiness for  
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29 14 this implementation. Based on this analysis, preparatory workshops for the actual intervention  
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31 15 should be provided. Even though the content of the parallel line manager and senior  
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33 16 management interventions should be retained, more elements fostering the dialog between the  
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35 17 two hierarchical levels should be included [52].  
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### 19 **Strengths and limitations**

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47 20 This study has several strengths that should be highlighted. First, iLead is a generic  
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49 21 intervention that is theory driven and has been developed involving relevant stakeholders  
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51 22 (e.g., line and senior management). It is based on the FRLM, which mirrors relevant  
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53 23 leadership behaviors that were also previously identified in implementation research [5–  
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55 24 10,26]. As it has been highlighted that general active leadership is not sufficient to reach  
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57 25 specific results (e.g., a successful implementation) [20,53], iLead focuses on active  
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1 implementation leadership. Second, to evaluate iLead, a sophisticated longitudinal  
2 multisource design has been applied using both quantitative and qualitative data, which made  
3 it possible to capture the intervention context and ongoing process to understand the effects of  
4 iLead. Third, evaluation was facilitated by the iLead scale [54], capturing implementation  
5 leadership of the specific implementation case. The scale was specifically developed for this  
6 purpose, as it has been highlighted that the utilized evaluation criterion needs to be aligned  
7 with the intervention content [55]. The iLead scale can also be a useful tool in practice to  
8 provide managers with feedback regarding their implementation leadership.

9 The current study has also some shortcomings that must be acknowledged. First, the  
10 recruitment processes for the intervention and assignment to the two intervention groups  
11 might have introduced a systematic bias. Randomization of managers was not possible and we  
12 cannot exclude that intervention groups differed systematically. Moreover, drop out varied  
13 between the groups, which might have affected the generalizability of results, particularly for  
14 group 1. Furthermore, the lack of randomization makes it impossible to separate effects of  
15 time from effects of the intervention, hence, an evaluation framework and multiple data  
16 sources were used to mitigate the risk of erroneous conclusions. Second, some outcomes  
17 (reactions and learning) relied on self-reports, which can be biased through common method  
18 bias [56,57]. Third, to investigate behavior change as an effect of the iLead intervention  
19 transition rating questions were used. Transition ratings are ascribed to overestimate effect  
20 sizes [58] as well as being influenced by the present state bias [59,60]. These biases could  
21 however not be found in a recent study comparing different ways of assessing change [61]. A  
22 traditional pre-post evaluation measurement was not feasible for several reasons. First, the  
23 iLead scale [45] could only be administered at the two follow up measurements because  
24 managers were still undecided regarding their implementation case when the baseline  
25 measurement was conducted pre intervention. Moreover, a comparisons of overall mean

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3 1 changes pre-post intervention might not to be feasible in iLead, where each manager's work  
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5 2 took its starting point in her/his specific stage of her/his specific implementation case to  
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7 3 assure the perceived usability of the intervention. Even in the contextualized intervention  
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10 4 group, where the same implementation case was a focus, local conditions varied and led to  
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12 5 different time plans. Hence, timely aligned of measurement with managers' individual change  
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14 6 processes [62] is challenging with individualized interventions when the implementation  
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16 7 process does not follow the time frame of the intervention; that is, when managers differ in  
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18 8 their implementation progress and, therefore, vary in their ability to show implementation  
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20 9 leadership. In addition, managers set individual leadership goals based on their strengths,  
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22 10 weaknesses and work group needs. While probably beneficial for the individual participant,  
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24 11 tailoring the intervention to the participants created a large variation of goals and pace in the  
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26 12 implementation. Fourth, healthcare organizations are fast-moving entities with high turnover  
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28 13 [63], resulting in changes in the work unit composition across measurement times manifesting  
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30 14 in different sample sizes for the analyses. Only a smaller group could be followed across all  
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32 15 three time points. In addition, whereas iLead focused on active implementation leadership,  
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34 16 recent research shows that destructive leadership has detrimental effects [20,64]; hence,  
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36 17 including how to decrease passive leadership in leadership trainings is another avenue for  
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38 18 future research.  
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## 47 **Conclusions**

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49 21 This study shows that a generic implementation leadership training that is based on the FRLM  
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51 22 may lead to positive outcomes in participating line managers' reactions and implementation  
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53 23 knowledge. However, it also shows how hard it is to achieve transfer from training to  
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55 24 behavioral change. Efforts to support transfer through contextualization was not successful.  
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57 25 Potential explanations are offered by interview data, which suggest a counter effect of  
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3 1 impeding organizational factors. Hence, contextualization may not be sufficient to  
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5 2 counterbalance such factors, calling for a thorough organizational analysis to identify  
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7 3 hindering factors for the implementation beforehand.  
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10 4

## 11 5 **Abbreviations**

12 6 FRLM - full range leadership model

13 7 EBP - evidence-based practice

14 8

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17 11 questionnaires and participated in the intervention.  
18  
19 12

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27  
28 20

## 29 21 **Ethical approval and consent**

30 22 All procedures were approved by the regional research ethics committees in Stockholm,  
31 23 Sweden (ref no. 2015/857-31/5). Written informed consent was obtained for all study  
32 24 participants.  
33  
34 25



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3 1 **Patient consent** Not required.  
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5 2

6  
7 3 **Availability of data and materials**

8 4 The analyzed dataset used for this study is available from Dr. Anne Richter  
9  
10 (anne.richter@ki.se) on reasonable request.  
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14 6

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16  
17 7 **Consent for publication**

18 8 Not applicable  
19  
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22 9

23  
24 10 **Competing interests**

25  
26 11 The authors declare that they have no competing interests.  
27  
28  
29

30 12

31 13 **Authors' contribution**

32  
33 14 AR: Study conception and design, Acquisition of data, Analysis and interpretation of data,  
34  
35 15 Drafting of manuscript, Critical revision  
36

37 16 CL: Analysis and interpretation of data, Drafting of manuscript, Critical revision  
38

39  
40 17 HH: Study conception and design, Acquisition of data, Analysis and interpretation of data,  
41  
42 18 Drafting of manuscript, Critical revision  
43

44 19 UVTS: Study conception and design, Acquisition of data, Analysis and interpretation of data,  
45  
46 20 Drafting of manuscript, Critical revision  
47

48  
49 21 RL: Interpretation of Data, Drafting of manuscript, Critical revision  
50

51 22 RM: Analysis and interpretation of data, Drafting of manuscript, Critical revision  
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53 23 TH: Interpretation of Data, Critical revision  
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55  
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**References:**

- 1 Damschroder LJ, Goodrich DE, Robinson CH, *et al.* A systematic exploration of differences in contextual factors related to implementing the MOVE! weight management program in VA: A mixed methods study. *BMC Health Serv Res* 2011;**11**:248–61.
- 2 Aarons G, Hurlburt M, Horwitz SM. Advancing a conceptual model of evidence-based practice implementation in public service sectors. *Adm Policy Ment Health* 2011;**38**:4–23.
- 3 Kitson AL, Rycroft-Malone J, Harvey G, *et al.* Evaluating the successful implementation of evidence into practice using the PARiHS framework: theoretical and practical challenges. *Implement Sci* 2008;**3**:1–12.
- 4 Gifford W, Holyoke P, Squires JE, *et al.* Managerial leadership for research use in nursing and allied health care professions: a narrative synthesis protocol. *Syst Rev* 2014;**3**:57–64.
- 5 Reichenpfader U, Carlford S, Nilsen P. Leadership in evidence-based practice: a systematic review. *Leadersh Heal Serv* 2015;**28**:298–316.
- 6 Sandstrom B, Borglin G, Nilsson R, *et al.* Promoting the implementation of evidence-based practice: a literature review focusing on the role of nursing leadership. *Worldviews Evid Based Nurs* 2011;**8**:212–23.
- 7 Avolio BJ, Reichard RJ, Hannah ST, *et al.* A meta-analytic review of leadership impact research: Experimental and quasi-experimental studies. *Leadersh Q* 2009;**20**:764–84.
- 8 Wong C, Cummings GG, Ducharme L. The relationship between nursing leadership and patient outcomes: a systematic review update. *J Nurs Manag* 2013;**21**:709–24.
- 9 Eisenbach R, Watson K, Pillai R. Transformational leadership in the context of organizational change. *J Organ Chang Manag* 1999;**12**:80–9.

- 1  
2  
3 10 Ovretveit J. Improvement leaders: what do they and should they do? A summary of a  
4 review of research. *Qual Saf Health Care* 2010;**19**:490–2.  
5  
6  
7 11 McMillen J, Raffol M. *Characterizing the Quality Workforce in Private U.S. Child and*  
8 *Family Behavioral Health Agencies*. 2015.  
9  
10  
11  
12 12 Fixsen DL, Blase KA, Naoom SF, *et al*. Core Implementation Components. *Res Soc*  
13 *Work Pract* 2009;**19**:531–40.  
14  
15  
16  
17 13 Aarons GA, Ehrhart MG, Farahnak LR, *et al*. Leadership and organizational change for  
18 implementation (LOCI): a randomized mixed method pilot study of a leadership and  
19 organization development intervention for evidence-based practice implementation  
20 Crossing the Quality Chasm: A New Health System for. *Implement Sci* 2015;**10**:1–12.  
21  
22  
23  
24  
25  
26 14 Gifford W a, Davies BL, Graham ID, *et al*. Developing Leadership Capacity for  
27 Guideline Use : A Pilot Cluster Randomized Control Trial. *Worldviews Evid Based*  
28 *Nurs* 2012;**10**:51–65.  
29  
30  
31  
32  
33 15 Richter A, von Thiele Schwarz U, Lornudd C, *et al*. iLead-a transformational  
34 leadership intervention to train healthcare managers' implementation leadership.  
35 *Implement Sci* 2016;**11**:108–21.  
36  
37  
38  
39  
40 16 Proctor EK, Chambers DA. Training in dissemination and implementation research: a  
41 field-wide perspective. *Transl Behav Med* 2016;**7**:624–35.  
42  
43  
44  
45 17 Chambers DA, Proctor EK, Brownson RC, *et al*. Mapping training needs for  
46 dissemination and implementation research: lessons from a synthesis of existing  
47 D&I research training programs. *Transl Behav Med* 2016;**7**:593–601.  
48  
49  
50  
51 18 Bass BM, Avolio BJ. Transformational leadership: A response to critiques. In:  
52 Chemers MM, Aymann R, eds. *Leadership theory and research: Perspectives and*  
53 *directions*. San Diego, CA, US: : Academic Press Inc 1993. 49–80.  
54  
55  
56  
57  
58 19 Avolio BJ. *Full range leadership development*. Thousand Oaks, CA: : SAGE  
59  
60

- 1  
2  
3 Publications, Incorporated 2011.  
4  
5  
6 20 Judge TA, Piccolo RF. Transformational and transactional leadership: a meta-analytic  
7  
8 test of their relative validity. *J Appl Psychol* 2004;**89**:755–68.  
9  
10  
11 21 Wang G, Oh I-S, Courtright SH, *et al.* Transformational leadership and performance  
12  
13 across criteria and levels: A meta-analytic review of 25 years of research. *Gr Organ*  
14  
15 *Manag* 2011;**36**:223–70.  
16  
17 22 Lowe KB, Kroeck KGG, Sivasubramania N, *et al.* Effectiveness correlates of  
18  
19 transformational and transactional leadership: A meta-analytic review of the mlq  
20  
21 literature. *Leadersh Q* 1996;**7**:385–425.  
22  
23  
24 23 Dum Dum UR, Lowe KB, Avolio BJ. A Meta-Analysis of Transformational and  
25  
26 Transactional Leadership Correlates of Effectiveness and Satisfaction: An Update and  
27  
28 Extension. In: Avolio BJ, Yammarino FJ, eds. *Transformational and Charismatic*  
29  
30 *Leadership: The Road Ahead 10th Anniversary Edition*. Emerald Group Publishing  
31  
32 Limited 2013. 39 – 70.  
33  
34  
35 24 Degroot T, Kiker DS, Cross TC. A Meta-Analysis to Review Organizational Outcomes  
36  
37 Related to Charismatic Leaders h i p. 2000.  
38  
39  
40 25 Battilana J, Gilmartin M, Sengul M, *et al.* Leadership competencies for implementing  
41  
42 planned organizational change. *Leadersh Q* 2010;**21**:422–38.  
43  
44  
45 26 Gifford W, Davies B, Edwards N, *et al.* Managerial leadership for nurses' use of  
46  
47 research evidence: an integrative review of the literature. *Worldviews Evid Based Nurs*  
48  
49 2007;**4**:126–45.  
50  
51  
52 27 Collins DB, Holton EF. The effectiveness of managerial leadership development  
53  
54 programs: A meta-analysis of studies from 1982 to 2001. *Hum Resour Dev Q*  
55  
56 2004;**15**:217–48.  
57  
58  
59 28 Lacerenza CN, Reyes DL, Marlow SL, *et al.* Leadership training design, delivery, and  
60

- 1  
2  
3 implementation: A meta-analysis. *J Appl Psychol* 2017;**102**:1686–718.  
4  
5  
6 29 Lornudd C, Bergman D, Sandahl C, *et al.* A randomised study of leadership  
7 interventions for healthcare managers. *Leadersh Heal Serv* 2016;**29**:358–76.  
8  
9  
10 30 Georgenson DL. The Problem of Transfer Calls for Partnership. *Train Dev J*  
11 1982;**82**:75.  
12  
13  
14 31 Grossman R, Salas E. The transfer of training: what really matters. *Int J Train Dev*  
15 2011;**15**:103–20.  
16  
17  
18 32 Baldwin TT, Ford JK. Transfer of Training: A Review and Direction for Future  
19 Research. *Pers Psychol* 1988;**41**:63–105.  
20  
21  
22 33 Blume BD, Ford JK, Baldwin TT, *et al.* Transfer of Training: A Meta-Analytic  
23 Review. *J Manage* 2009;**36**:1065–105.  
24  
25  
26 34 Nielsen K, Randall R. Opening the black box: Presenting a model for evaluating  
27 organizational-level interventions. *Eur J Work Organ Psychol* 2013;**22**:601–17.  
28  
29  
30 35 Hill NS, Seo M-G, Kang JH, *et al.* Building Employee Commitment to Change Across  
31 Organizational Levels: The Influence of Hierarchical Distance and Direct Managers’  
32 Transformational Leadership. *Organization Sci* 2011;**23**:758–77.  
33  
34  
35 36 Biron C, Karanika-Murray M, Cooper C. *Improving organizational interventions for*  
36 *stress and well-being: Addressing process and context.* London: : Routledge 2012.  
37  
38  
39 37 Kirkpatrick D. Great ideas revisited. Techniques for evaluating training programs.  
40 Revisiting Kirkpatrick’s four-level model. *Train Dev* 1996;**50**:54–9.  
41  
42  
43 38 Blamey A, Mackenzie M. Theories of Change and Realistic Evaluation: Peas in a Pod  
44 or Apples and Oranges? *Evaluation* 2007;**13**:439–55.  
45  
46  
47 39 von Thiele Schwarz U, Richter A, Hasson H. Getting everyone on the same page: Co-  
48 created Program Theory. In: Nielsen K, Noblet A, eds. *Implementing and evaluating*  
49 *organizational interventions.* Routledge 2018. 42–67.  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

- 1  
2  
3 40 Ivankova N V, Creswell JW, Stick SL. Using Mixed-Methods Sequential Explanatory  
4  
5 Design: From Theory to Practice. *Field methods* 2006;**18**:3–20.  
6  
7  
8 41 Freedman DS, Thornton A, Camburn D. Maintaining Response Rates In Longitudinal  
9  
10 Studies. *Sociol Methods Res* 1980;**9**:87–98.  
11  
12 42 Fridrich A, Jenny GJ, Bauer GF. Development of a generic process appraisal scale for  
13  
14 organizational health intervention elements. *Manuscr Submitt Publ* 2016.  
15  
16  
17 43 Eklof M, Hagberg M. Are simple feedback interventions involving workplace data  
18  
19 associated with better working environment and health? A cluster randomized  
20  
21 controlled study among Swedish VDU workers. *Appl Ergon* 2006;**37**:201–10.  
22  
23  
24 44 Hasson H, Gilbert-Ouimet M, Baril-Gingras G, *et al.* Implementation of an  
25  
26 organizational-level intervention on the psychosocial environment of work: comparison  
27  
28 of managers' and employees' views. *J Occup Environ Med* 2012;**54**:85–91.  
29  
30  
31 45 Mosson R, Von Thiele Schwarz U, Hasson H, *et al.* How do iLead? Validation of a  
32  
33 scale measuring active and passive implementation leadership in Swedish healthcare.  
34  
35 *BMJ Open* 2018;**8**.  
36  
37  
38 46 Raudenbush SW, Bryk AS. *Hierarchical Linear Models: Applications and Data*  
39  
40 *Analysis Methods*. Thousand Oaks, CA: : Sage 2002.  
41  
42  
43 47 Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol*  
44  
45 2006;**3**:77–101.  
46  
47  
48 48 von Thiele Schwarz U, Hasson H, von Thiele Schwarz U, *et al.* Alignment for  
49  
50 Achieving a Healthy Organization. In: Bauer GF, Jenny GJ, eds. *Salutogenic*  
51  
52 *organizations and change*. Dordrecht: : Springer Netherlands 2013. 107–25.  
53  
54  
55 49 Fixsen DL, Naoom SF, Blase KA, *et al.* Implementation research: A synthesis of the  
56  
57 literature. Tampa, FL: 2005.  
58  
59  
60 50 Damschroder LJ, Aron DC, Keith RE, *et al.* Fostering implementation of health

- services research findings into practice: a consolidated framework for advancing implementation science. *Implement Sci* 2009;**4**:50.
- 51 NytrØ K, Saksvik PØ, Mikkelsen A, *et al.* An appraisal of key factors in the implementation of occupational stress interventions. *Work Stress* 2000;**14**:213–25.
- 52 Hasson H, Lornudd C, von Thiele Schwarz U, *et al.* Supporting Senior management to enhance the effectiveness of a Line Manager Training Program. In: Nielsen K, Noblet A, eds. *Implementing and evaluating organizational interventions*. Taylor and Francis 2018. 169–94.
- 53 Bass BM, Avolio BJ, Jung DI, *et al.* Predicting unit performance by assessing transformational and transactional leadership. *J Appl Psychol* 2003;**88**:207–18.
- 54 Mosson R, von Thiele Schwarz U, Hasson H, *et al.* How do iLead? Validation of a scale measuring active and passive implementation leadership in Swedish healthcare. *BMJ Open* 2018;**8**:e021992.
- 55 Taylor PJ, Russ-Eft DF, Taylor H. Transfer of management training from alternative perspectives. *J Appl Psychol* 2009;**94**:104–21.
- 56 Cote JA, Buckley MR. Measurement Error and Theory Testing in Consumer Research: An Illustration of the Importance of Construct Validation. *J Consum Res* 1988;**14**:579–82.
- 57 Podsakoff PM, MacKenzie SB, Lee J-Y, *et al.* Common method biases in behavioral research: A critical review of the literature and recommended remedies. *J Appl Psychol* 2003;**88**:879–903.
- 58 Schmitt J, P Di Fabio R. The Validity of Prospective and Retrospective Global Change Criterion Measures. *Arch Phys Med Rehabil* 2006;**86**:2270–6.
- 59 Middel B, de Greef M, Jongste MJL, *et al.* Why Don't We Ask Patients With Coronary Heart Disease Directly How Much They Have Changed After Treatment? *J*



- 1  
2  
3 *Cardiopulm Rehabil* 2002;**22**:47–52.  
4  
5  
6 60 Mcphail S, Comans T, Haines T. Evidence of disagreement between patient-perceived  
7  
8 change and conventional longitudinal evaluation of change in health-related quality of  
9  
10 life among older adults. *Clin Rehabil* 2010;**24**:1036–44.  
11  
12 61 Meyer T, Richter S, Raspe H. Agreement between pre-post measures of change and  
13  
14 transition ratings as well as then-tests. *BMC Med Res Methodol* 2013;**13**:52.  
15  
16  
17 62 Zapf D, Dormann C, Frese M. Longitudinal studies in organizational stress research: a  
18  
19 review of the literature with reference to methodological issues. *J Occup Health*  
20  
21 *Psychol* 1996;**1**:145–69.  
22  
23  
24 63 National Board of Health, Welfare. Competence maintenance and patient safety- How  
25  
26 deficits in staffing and competence affect patient safety [Kompetensförsörjning och  
27  
28 patientsäkerhet-Hur brister i bemanning och kompetens påverkar patientsäkerheten].  
29  
30 Stockholm: 2018.  
31  
32  
33 64 Kelloway EK, Mullen J, Francis L. Divergent effects of transformational and passive  
34  
35 leadership on employee safety. *J Occup Health Psychol* 2006;**11**:76–86.  
36  
37  
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## Appendix 1. Interview guide

### Introduction:

Can you describe your role as a manager?

### Transfer of knowledge to practice:

-What have you learnt from the training? How have you used what you have learnt in the training?

-Have you learnt something during the training that you are keen to use related to your leadership? Something that stands out as particularly important?

-Which parts of the training did you perceive to good and where there parts that were missing?

-Have you had the chance to use what you have learnt during the training? Can you provide examples?

-Can you recall a work situation when it worked well to use what you learnt in the training? What do you think was the reason for why it went well?

-Do you think there will be more of these situations where you will be able to use the things you learnt in the training?

-Where there situations where you used something from the training in a different way? Did that result in the desired outcome? And why?

-Have you experience difficulties in using what you have learnt in the training in your practice?

-Have you experienced conflicts between the training and your workplace/practice when you have tried to use the new leadership behaviors?

1  
2  
3 -Have you experienced something in you or your situation that can make it more difficult to  
4 use these new leadership behaviors?  
5

6  
7  
8 -Can you recall a work situation when it did not work well to use what you have learnt in the  
9 training? What do you think was the reason for this?  
10

11  
12 -What could facilitate that you can use the knowledge from the training? Factors in you or  
13 your workplace?  
14

15  
16 -How much effort have you invested to try using what you have learnt in the training?  
17

18  
19 -Did you receive the support that you would have needed to use what you learnt in the  
20 training? What and which aspects have been supporting?  
21

22  
23 -If not, which support would you have needed to be able to use what you have learnt in the  
24 training at your workplace?  
25

26  
27 -Do you experience that the training has change your or others way of thinking about the  
28 implementation? Can you give concrete examples?  
29

30  
31 -Do you experience that the training has changed your or others behavior at your workplace?  
32 Can you give concrete examples?  
33

34  
35 -If you experienced change, is the change only related to this concrete implementation you  
36 were working on or your leadership in general? Has your leadership changed over and above  
37 the current implementation?  
38  
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46  
47 **Attitudes:**

48  
49 -Was it possible to transfer what you learnt in the training to your colleagues/employees at  
50 your unit?  
51

52  
53 -What was easier and more challenging in that translation work? Which parts have worked  
54 and which did not?  
55  
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1  
2  
3 -Was there a specific person that was particular supportive/hindering when it comes to  
4 spreading your knowledge?  
5

6  
7 -What do you think your second line manager and senior management would have needed to  
8 support your and your employees' change?  
9

10  
11 -What in the training was the most important part for you to be able to transfer your  
12 knowledge from the training into practice?  
13

14  
15 -Did you miss something in the training? What would you have needed to transfer what you  
16 have learned to your workplace/employees?  
17

18  
19 -Is there something else that you have been thinking about related to the training?  
20  
21

### 22 23 24 25 26 **Effects of the training:**

27  
28 -Do you monitor what you have been working on? What do you do?  
29

30  
31 -How much help and support was the training to your implementation process on a scale from  
32 1 to 10? Can you further develop why it was a [number between 1 and 10].  
33

34  
35 -How well did your action plan work at your workplace on a scale from 1 to 10? Can you  
36 further develop why it was a [number between 1 and 10].  
37

38  
39 -To what extent was the intervention plan translated into practice on a scale from 1 to 10? Can  
40 you further develop why it was a [number between 1 and 10].  
41  
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43

### 44 45 46 **Context:**

47  
48 -Was there something in the organization or context that affected your work with the  
49 implementation and leading the implementation?  
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## STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation	Page No
<b>Title and abstract</b>	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	1
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	1
<b>Introduction</b>			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	3-5
Objectives	3	State specific objectives, including any prespecified hypotheses	6
<b>Methods</b>			
Study design	4	Present key elements of study design early in the paper	7
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	7
Participants	6	(a) <i>Cohort study</i> —Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up <i>Case-control study</i> —Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls <i>Cross-sectional study</i> —Give the eligibility criteria, and the sources and methods of selection of participants	7-9
		(b) <i>Cohort study</i> —For matched studies, give matching criteria and number of exposed and unexposed <i>Case-control study</i> —For matched studies, give matching criteria and the number of controls per case	
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	12-13
Data sources/measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	9-10
Bias	9	Describe any efforts to address potential sources of bias	24-25
Study size	10	Explain how the study size was arrived at	8-9
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	14
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	14
		(b) Describe any methods used to examine subgroups and interactions	14
		(c) Explain how missing data were addressed	14
		(d) <i>Cohort study</i> —If applicable, explain how loss to follow-up was addressed <i>Case-control study</i> —If applicable, explain how matching of cases and controls was addressed <i>Cross-sectional study</i> —If applicable, describe analytical methods taking account of sampling strategy	9
		(e) Describe any sensitivity analyses	-

Continued on next page

<b>Results</b>			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	9
		(b) Give reasons for non-participation at each stage	9
		(c) Consider use of a flow diagram	9
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	7-8
		(b) Indicate number of participants with missing data for each variable of interest	9,15,16-18
		(c) <i>Cohort study</i> —Summarise follow-up time (eg, average and total amount)	9
Outcome data	15*	<i>Cohort study</i> —Report numbers of outcome events or summary measures over time	9,12
		<i>Case-control study</i> —Report numbers in each exposure category, or summary measures of exposure	-
		<i>Cross-sectional study</i> —Report numbers of outcome events or summary measures	-
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	15,16-18
		(b) Report category boundaries when continuous variables were categorized	-
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	-
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	21
<b>Discussion</b>			
Key results	18	Summarise key results with reference to study objectives	20
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	22-25
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	25
Generalisability	21	Discuss the generalisability (external validity) of the study results	22-25
<b>Other information</b>			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	25

\*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

**Note:** An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at [www.strobe-statement.org](http://www.strobe-statement.org).

# BMJ Open

## **iLead- Evaluation of a generic implementation leadership intervention: A mixed method pre-post intervention design**

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<b>Primary Subject Heading</b>:	Public health
Secondary Subject Heading:	Evidence based practice
Keywords:	contextualization, full-range leadership model, implementation leadership training, intervention, organizational development

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Manuscripts

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3 **1 iLead- Evaluation of a generic implementation leadership intervention: A mixed method**  
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5 **2 pre-post intervention design**  
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### 13 **Abstract**

14 **Objectives:** The present study is an evaluation of the iLead intervention. We also  
15 investigate whether or not transfer of training can be supported by contextualizing the  
16 intervention (recruiting all managers from one branch of the organization while focusing on  
17 one implementation case, as well as training senior management).

18 **Design:** A pre-post evaluation design was applied using mixed methods with process and  
19 effect surveys and interviews to measure the effects on three levels.

20 **Setting:** Healthcare managers from Stockholm's regional healthcare organization were  
21 invited to the training.

22 **Participants:** 52 managers participated in the iLead intervention. Group 1 consisted of 21  
23 managers from different organizations and with different implementation cases. Group 2,  
24 representing the contextualized group, consisted of 31 managers from the same organization,  
25 working on the same implementation case, where senior management also received training.

1  
2  
3 1 **Intervention:** iLead is an intervention where healthcare managers are trained in  
4  
5 2 implementation leadership based on the full range leadership model (FRLM).

6  
7 3 **Primary outcome measures:** Reactions, knowledge and implementation leadership are  
8  
9 4 measured.

10  
11 5 **Results:** Quantitative and qualitative analyses indicate that iLead was perceived to be of  
12  
13 6 high quality and capable of increasing participants' knowledge. Mixed effects were found  
14  
15 7 regarding changes in behaviors. The contextualization did not have a boosting effect on  
16  
17 8 behavior change. Hence, group 2 did not increase their active implementation leadership in  
18  
19 9 comparison to group 1.

20  
21 10 **Conclusion:** iLead introduces a new approach to how implementation leadership can be  
22  
23 11 trained when knowledge of effective leadership for implementations is combined with  
24  
25 12 findings on the importance of environmental factors for the transfer of training. Even though  
26  
27 13 managers reported general positive effects, transfer was not facilitated through the  
28  
29 14 contextualization of the intervention. There is a need to further develop approaches to help  
30  
31 15 participants subsequently apply the learned skills in their work environment.  
32  
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40 17 **Keywords:** contextualization, full-range leadership model, implementation leadership  
41  
42 18 training, intervention, contextualization, organizational development  
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#### 47 20 **Strengths and limitations of this study**

48  
49 21 -The present study is based on a rigorous evaluation process of the iLead intervention  
50  
51 22 using mixed methods, where the quantitative evaluation method is followed up by interviews  
52  
53 23 to get a deep understanding of the effects.

54  
55 24 -Effects of the iLead intervention are measured on different levels based on a thorough  
56  
57 25 theory-based evaluation plan.  
58  
59  
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1  
2  
3 1 -Effects of the iLead intervention are, in addition to self-reports, measured through  
4  
5 2 employee-ratings, where employees report on their managers' implementation leadership  
6  
7 3 related to a current implementation.  
8  
9

10 4 - Multilevel modelling is applied to account for the nestedness of data, which is the case  
11  
12 5 for longitudinal data.  
13

14 6 -Drop out was more prominent in one intervention group and the response rate decreased  
15  
16 7 over time.  
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## **Background**

Implementing the ever-growing number of evidence-based methods into practice is an integral part of daily work in healthcare organizations. For implementation to be successful, leadership has been identified as a central factor [1–10]. However, many managers lack formal training in leadership and leading change, as they have often been promoted for their work as front-line providers [cf. 11]. In addition, existing studies on leadership during implementation have often lacked a theoretical underpinning [4–6,12], which prevents knowledge about how and why leadership is important for successful implementation. Accordingly, there is little research on how to train managers in leadership that facilitates the implementation process [e.g., 5]. Whereas there is some evidence for the effectiveness of training leaders in implementing evidence-based practice (e.g., EBP [13]) or specific evidence-based methods (e.g., preventing diabetic foot ulcers [14]), little is known about how to train generic implementation leadership (i.e., implementation leadership that can be used across various implementation efforts), a skill that is needed when leaders are expected to lead multiple simultaneous implementations as part of their daily work. The present study is an evaluation of the iLead intervention that aims to train managers in these generic implementation leadership skills [15] answering to calls highlighting the need to provide and evaluate trainings directed at individuals in implementation roles and therefore focusing on implementation practice [16,17].

## **The iLead intervention**

A large amount of leadership research has been based on the full-range leadership model (FRLM) [18,19] that describes both desired active leadership behaviors (i.e., transformational leadership and contingent reward) and undesired passive behaviors (i.e., management by exception and laissez faire). Active leadership has been related to positive organizational and

1 employee outcomes [7,20–24] and fostering change [7,9,25]. Even though the FRLM has only  
2 been used in a few studies that investigated implementation [e.g., 13], systematic reviews  
3 have identified leadership activities important for implementation that map well on the active  
4 leadership behaviors of the FRLM [5,6,10,26]. Based on this work, the FRLM was used in the  
5 iLead intervention [for the study protocol, see 15].

### 7 **Fostering transfer through a supporting organizational context**

8 Even though leadership development in general has been found to result in positive effects  
9 [7,27,28], it has been acknowledged that these often are limited to proximal outcomes such as  
10 reactions and knowledge [27,29]. Only 10% of training expenditure has been estimated to  
11 translate into behavioral change [30]. This highlights the transfer gap—the difficulty in  
12 translating knowledge and skills to the work setting [31].

13 Three primary factors influence the transfer of training: trainee characteristics, intervention  
14 design and delivery, as well as the post-training work environment [32]. Trainee  
15 characteristics include personality, the motivation to participate and existing skills, whereas  
16 intervention design and delivery defines the objectives of the training and the applied  
17 pedagogical methods that are used to bring about skills. The post-training work environment  
18 refers to the organizational context of participants, such as social support, transfer climate and  
19 the opportunity to perform and follow up of the new skills. Even though trainee  
20 characteristics could be used for the selection of participants, this is often not possible in  
21 practice; hence, the intervention design and the post-training work environment are factors  
22 that can be proactively tackled by interventionists to leverage transfer [cf. 33]. Therefore, in  
23 designing the iLead intervention, pedagogical tools to facilitating transfer were focused on  
24 (i.e., how the iLead workshops were brought about) (see upper part of table 1). Moreover, a  
25 feature that sets iLead apart from other interventions is its effort to further foster transfer by

1 incorporating a contextualized intervention group to also modify the training work  
 2 environment. Here senior management (i.e., a team of individuals at the highest level of the  
 3 organization) and all first-line managers from one organizational branch participated in the  
 4 training and worked on the same implementation case (see lower part of table 1). Involving  
 5 senior management is important as they not only allocate resources and have the authority to  
 6 restructure processes and structures to make the implementation work [34], they also generate  
 7 and help maintain managers' and employees' commitment [35] and compliance with an  
 8 intervention [36].

9  
 10 \_\_\_\_\_ Table 1 about here \_\_\_\_\_

11  
 12 Table 1. Intervention design and post training work environment factors to facilitate  
 13 transfer of training and the operationalization in the iLead intervention

	<b>Facilitators</b>	<b>Elements in the iLead intervention</b>	<b>Intervent</b>
	<b>for transfer of</b>		<b>ion group</b>
	<b>training</b>		
Intervention design	Behavioral modeling	Role play, planning their actions and practicing between workshops	1 & 2
	Error management	Role play, practicing between workshops and revising the action plan, one workshop on handling resistance and continuous problem solving	1 & 2
	Realistic training environment	Working on an ongoing implementation, practicing between workshops, examples from health care in the workshops	1 & 2



Training work environment	Peer and supervisor support	All first-line managers from one organization, in addition to a senior manager intervention	2
	Transfer climate	Interventions on different levels in the organization to create a shared mental model about implementation	2
	Opportunity to perform	One common implementation and the support of senior management to create alignment and direction	2
	Follow up structure	One common implementation and the support of senior management to create alignment and direction	2

## The present study

The overall aim of this study is to examine the primary outcomes of iLead, an intervention based on the FRLM [18,19] to train healthcare managers' generic implementation leadership. Based on Kirkpatrick's four-level evaluation model [37], four questions are addressed with a mixed-method evaluation:

1. How do managers perceive iLead?
2. Does iLead increase managers' knowledge related to implementation leadership?
3. Does iLead increase managers' skills in leading a current implementation?

Furthermore, we investigate under which conditions the iLead intervention has greater impact by studying the contextualization of the intervention. Thus, two intervention conditions were compared: an individualized group (group 1) and a contextualized group

1 (group 2). We expect no difference between the intervention groups regarding to their  
2 reactions and learning because both groups were exposed to the same intervention content and  
3 pedagogy. In contrast, we expect that contextualization (group 2) will facilitate the transfer of  
4 training resulting in the fourth question:

5 4. Does iLead result in a larger change of the behavioral outcome, i.e. generic  
6 implementation leadership, in group 2?

## 8 **Method**

9 A mixed-methods pre-post evaluation approach was applied with a two-armed, non-  
10 randomized intervention design in which managers—based on their organizational  
11 belonging—were assigned to one of the two intervention groups.

### 13 **Setting and participants in the intervention**

14 Healthcare managers from Stockholm's regional healthcare organization, which offers  
15 primary, psychiatric, rehabilitation and habilitation services as well as acute hospital care,  
16 were invited to participate in an implementation leadership training. More detailed  
17 information about the recruitment process can be found in the study protocol [15]. In total, 52  
18 managers participated (see table 2). The majority of managers worked as first-line managers  
19 (i.e., worked closest to and had managerial responsibility over operating staff) having  
20 responsibility for staff, budget as well as administration for one unit. The majority of  
21 managers were responsibility for one unit, whereas some managers had leadership  
22 responsibility for several small units (< 5 employees). In intervention group 1, two managers  
23 had second-line responsibility.

24 Group 1 consisted of 21 managers from different branches of the healthcare organization  
25 who work with different implementation cases during the intervention. Group 2 consisted of

1 31 managers from one division of the regional healthcare organization, where senior  
 2 management (the chief operating manager together with second-line managers) made  
 3 participation in the training mandatory. In practice that meant that first-line managers in group  
 4 2 were given time to participate in the intervention as a form of competence development. In  
 5 reconciliation with senior management, one first-line manager decided to not participate in  
 6 the training due to an on-going major reorganization of his/her unit. With some exceptions,  
 7 first-line managers worked with the same implementation case, which was determined by  
 8 senior management.

10 \_\_\_\_ Table 2 about here \_\_\_\_

Table 2. Descriptive statistics of managers in the two intervention groups

	Intervention group 1 (individualized group)	Intervention group 2 (contextualized group)
Number of participants	21	31
Total attrition	11	4
Dropout		
– Before the start	3	2
of the intervention		
– After WS1/2	3	1
– After WS3	1	1
– After WS4	1	-
Women	92.3%	96%
Age	50 (9.1)	50.8 (8.3)
University education	73.3%	81.3%

Years being a manager	3.3 (2.09) [0.2-9]	4.4 (3.9) [0.5-13]
Number of employees	25.15 (12.70) [5-50]	21.83 (7.78) [8-39]

Notes: means and standard deviations (SD) are presented for age, years as manager and number of employees. Range [minimum – maximum] is presented for years as manager and total number of employees.

The two groups of managers had similar demographic characteristics, which are representative of employees in the Swedish healthcare sector [38] (see table 2).

Attrition was greater for group 1 (for details and time of drop out see table 2). On average, managers from group 1 participated in three out of the four training occasions (SD=.84), whereas managers from group 2 participated on 3.5 occasions (SD=.79).

### **Intervention**

The iLead intervention consists of five half-day workshops, which were provided at four occasions. The intervention content was the same for intervention groups 1 and 2. More detailed information about the development and content of iLead can be found in the study protocol [15] as well as in supplementary file 1.

### **Patient and public involvement**

When the iLead intervention was designed a good fit between the intervention, the healthcare context and participants' needs was ensured through the involvement of five national experts in implementation and leadership training (consults or researchers in the area), 31 first line managers, and nine senior managers participated in a co-created program logic process, generating attitudes, skills and behaviors of successful implementation leaders. The output was used to define intervention goals and activities [for more information see 39]. Patient's involvement was not applicable in this study.

## Data sources for the evaluation

A sequential exploratory design was used [40]. Quantitative surveys were conducted prior and twice after the intervention followed with qualitative interviews to enhance our understanding of the training impact. Shorter process evaluation surveys were also conducted after each individual workshop. To strengthen the research design, the participating managers, as well as their employees, were included in the data collection (for an overview see Figure 1).

Table 3 shows response rates for the effect and process evaluations. Response rates decreased over time, which is common in longitudinal studies [41].

\_\_\_\_Figure 1 about here\_\_\_\_

\_\_\_\_Table 3 about here\_\_\_\_

Table 3. Response rates for managers and employees

	Process evaluation (self-rated manager data)				Effect evaluation (employee data)		
	WS1/2	WS3	WS4	WS5	Pre-test	Post-test 1	Post-test 2
Gro	15/18	10/15	8/14	10/10	252/477	160/368	132/268
up 1	(83.3%)	(66.6%)	(57.1%)	(100%)	(52.8%)	(43.4%)	(49.2%)
Gro	26/29	23/28	22/27	22/27	432/607	313/562	292/544
up 2	(89.5%)	(82.1%)	(81.4%)	(81.4%)	(71.1%)	(55.6%)	(53.6%)

Nine individual semi-structured interviews were conducted by a researcher who was not involved in the intervention. The interview guide was developed based on Kirkpatrick's evaluation model and Baldwin and Ford's transfer of training model [32,37] (for the interview

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2  
3 1 guide, see appendix). Interviews, which lasted for approximately one hour, took place at the  
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5 2 respondents' work places and were recorded and transcribed verbatim by an external  
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7  
8 3 transcription service.  
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12 5 **Measures in the process evaluation and pre-post effect evaluation surveys**

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14 6 Measurements are described in Table 4.  
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19 8 \_\_\_ Table 4 about here \_\_\_  
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Table 4. Constructs in the process evaluation and pre and post intervention surveys

Research question	Construct	Content	N o. of items	Response alternatives	Reference	Time of measurement	Cronbach's alpha
<b>Process evaluation (self-rated manager data)</b>							
1	Appraisal of the intervention as a whole	Complexity, relevance, novelty, valence involvement	10	ten-point continuum for each adjective pair	[42]	WS5	.81 .68 .84 .60 .29
2	Knowledge about implementation and		6	1 (strongly disagree) - 10 (strongly	specially constructed to match	WS1/2, WS3,	.90 .97

1

	implementation leadership		agree)	the iLead	WS4,	.93
				intervention	WS5	.97

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**Pre and post intervention surveys (employee data)**

3	Changes in implementation and leadership	Extent of perceived changes in the implementation of the new method as well in the manager’s leadership during the last six months	2	1 (big impairment) - 5 (no change) to 10 (great improvement)	[43,44]	T2 T3	.79 .74
4	Active implementation leadership	Leadership behaviors in line with FRLM related to the implementation	13	1 (strongly disagree)- 5 (strongly agree)	[45]	T2 T3	.95 .96

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Notes: WS= workshop, T2= post measure 1, T3= post measure 2



1

## 2 **Analyses**

3 Multilevel modeling was used to analyze data based on three or more repeated  
4 measurements to account for the hierarchical nature of the data [46]. Two-level models with  
5 the repeated measure at the first level and the individual person at the second level—the  
6 individual employee at the first level and the group belongingness at the second level,  
7 respectively—were constructed. Nested models were compared by using full maximum-  
8 likelihood estimation [46]. Time was centered on the baseline, respectively WS1/2, whereas  
9 the group remained uncentered (0=intervention group 1, 1=intervention group 2). The multi-  
10 level models were run in Mplus 7.2, whereas all other analyses were conducted in SPSS 24.

11  
12 Interviews were analyzed using thematic data analysis [47]. A semantic approach was  
13 used, (i.e., the explicit meaning of the data was analyzed). Patterns in the narrative material  
14 that captured something important in relation to the above-outlined evaluation models were  
15 selected [32,37]. Next, the themes were reviewed by the research team. A few themes were  
16 revised or excluded because they overlapped with other themes or were less prevalent (raised  
17 by less than three respondents).

## 18 19 **Results**

### 20 **Reactions to the intervention**

21 Participants were satisfied (ratings over 7 out of maximum 10) with the training's  
22 complexity, relevance, valence, their involvement and the novelty of the content. No group  
23 differences were found (see table 5), which is in line with our expectations. The quantitative  
24 results were strengthened by interview data (for quotes, see the bottom of table 5). In the  
25 analysis two themes emerged. First, managers emphasized that they were able to work hands-

1 on with their implementation cases, which differed from other trainings they had attended  
 2 (Quote 1). Moreover, they highlighted the usefulness of the action plan guiding their  
 3 implementation work during the iLead intervention, which made their intuitive knowledge of  
 4 the implementation process more explicit (Quote 2) and helped them clarify the  
 5 implementation for employees. Secondly, the use of role play was perceived to be influential  
 6 on the managers' development and understanding (Quote 3).

7  
 8 \_\_\_ Table 5 about here \_\_\_

9  
 10 Table 5. Reactions to the intervention and related quotes

	Complexity	Relevance	Valence	Involvement	Novelty
Group 1	9.15	9.35	9.15	8.85	7.85
Group 2	8.52	9.06	8.63	8.56	7.09
Difference	$t_{(30)}=.99$	$t_{(30)}=.58$	$t_{(30)}=.90$	$t_{(30)}=.55$	$t_{(30)}=1.63$

Notes: independent t-test did not reveal significant differences between the two groups

#### Interview quotes

Quote 1 ID7: What has been the best, and most beneficial, for me was to be very concrete. Often when participating in various kinds of education programs, you get a theoretical top-up in some way, and then there is usually another step where you as a participant need to think about how to work with this in your practice alone. It is pretty easy to get stuck in this process and fail to

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follow through... //

Quote 2 ID 9: ...when I got to see this training, I felt that I was pretty good at implementation, simply out of experience. I have learned through experience. But what I haven't done is a structured implementation action plan, previously I had gone through the steps only in my head. This structured process plan, I feel...will give me an enormous strength in the future.

Quote 3 ID2: Yes, I really appreciated those exercises, both when we were to give a talk [about our implementation case] and catch the others' interest, and then this exercise where there was a challenge...where there was a group that had been told to have different opinions [about the implementation case] and then a manager tried to handle that. // I think that was very valuable. Role plays and when you get to practice with each other, that helped me a lot.

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## Improvements in implementation leadership knowledge

Managers reported an increase in knowledge about implementation and how to lead this process over time and no differences between intervention groups was detected (see Table 6), which is in line with our expectations. In the interviews, managers expressed increased knowledge concerning implementation leadership as a generic skill, the structure and the iterative nature of the implementation process (see Table 6, Quote 4 & 5) and the possibility to lead an implementation decoupled from knowledge about the specific content of the implementation (Quote 6).

\_\_ Table 6 about here \_\_

Table 6. Multilevel models predicting change in knowledge and related quotes

Knowledge (ICC=.44)			
	Model 1	Model 2	Model 3
Intercept	6.92*	5.97*	6.37*
Time		.41*	.42*
Group			-.62
$\sigma^2_e$	1,39*	1,10*	1,10*
$\sigma^2_{u0}$	1,12*	1,20*	1,11*
-2*log(lh)	497.62	474.3	471.8
df	3	4	5
$\Delta^{-2*\log(lh)}$		23.3*	2.5
$\Delta_{df}$		1	1
Pseudo			.21
$R_1^2$			
Pseudo			.01
$R_2^2$			

Note: Table entries represent unstandardized parameter estimates. Individual level: N =128-140; group level: N =42. Time is centered at WS1/2, intervention group is coded 0=intervention group 1 and 1=intervention group 2, \*p<.05.

Interview quotes	
Quote 4	ID9: ... I have become more conscious and more structured concerning what I need to think about when working through the different steps [of the implementation], and also the clarification of what behavior it is that I want to change.
Quote 5	ID1: It is not a failure that it didn't go well... //...like, okay, we tried

something, oh well—let’s try again, and in this way you can proceed. So, it [the action plan for the implementation] is not finished when you launch it.

Quote 6 ID7: //...the *leading* aspect is somehow something you can learn; to implement something new without having to have deep knowledge of the particular [implementation case]...then I can feel more confident in managing restructurings. //...previously when I have been manager and implemented quality registries...//...I think I lost myself in the content [of the implementation] in some way...//

**Improvements in implementation leadership behavior**

When reviewing the last six months, employees experienced an improvement in implementation and their manager’s leadership practices. No difference was found between the intervention groups (see Table 7, left side). Active implementation leadership at T2 did not differ between groups nor did group 2 have a steeper increase in implementation leadership between T2 and T3 (see Table 7, right side).

\_\_Table 7 about here\_\_

Table 7. Multilevel Estimates for Models predicting implementation leadership (employee ratings)

	CP T2		CP T3		AIL T2		AIL T3	
	(ICC=.035)		(ICC=.16)		(ICC=.26)		(ICC=.49)	
	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod
	el 1	el 2	el 1	el 2	el 1	el 2	el 1	el 2
Intercept	6.10	.6.3	5.93	3.36	3.76	3.70	3.64	.97*
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CP <sup>a</sup> /AIL	-	-	.42*	-	-	.73*		
<sup>b</sup> T2			a			b		
Group		-.42	.06	.10		-.12		
$\sigma^2_e$	2.63	2.64	2.65	2.33	.65*	.65.	.62*	.35*
	*	*	*			23*		
$\sigma^2_{u0}$	.09	.04	.51*	.39	.24*		.60*	.18*
-	660.	658.	728.	645.	436.	426.	486.	336.
2*log(lh)	67	3	4	6	74	5	46	0
df	3	4	3	5	3	4	3	5
$\Delta^{-2*\log(lh)}$		2.4		82.8		.2		150.
			*					5*
$\Delta_{df}$		1		2		1		2
Pseudo		-		.12		.002		.43
R <sub>1</sub> <sup>2</sup>		.003						
Pseudo		.55		.23		.004		.69
R <sub>2</sub> <sup>2</sup>								

Note: unstandardized coefficients, CP= Changes in leadership procedures, AIL= Active implementation leadership, \*p<.05.

To sum up, employees experienced a positive change in both the implementation process and their manager's leadership practices, but no difference between groups could be found regarding an increase in active implementation leadership. Interviews provided a deeper insight in what participants perceived as particularly valuable and provide examples on altered ways of leading implementations. However, the boosting effect of the contextualization, which should facilitate a transfer of training for group 2, was absent. It became clear that varying attitudes toward the common implementation case (Table 8, quotes 7), the timing of the iLead intervention in relation to a concurrent major organizational change (Table 8, quotes 8) and a perceived lack of support from senior management and peers

1 (Table 8, quotes 9) may have mitigated the impact that the contextualization had on the  
 2 outcomes.

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4     \_\_ Table 8 about here \_\_

6     Table 8. Quotes related to the contextualization

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Interview quotes

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Quote 7     ID11: It was in the midst of this reorganization when managers were  
 dealing with crying employees who were going to be transferred and so on.  
 And then one was asked to focus on implementing the new [common]  
 program. There must have been a lot of other cases that we could have  
 implemented that would have been more appropriate to implement at this  
 moment in time...

Quote 8     Id 7: I think that it was unfortunate that we were in the midst of the  
 reorganization while the training program was simultaneously running. I think  
 that it was very interesting to participate in the training and that it is very  
 important for all of us to do this. However, I think that employees may have  
 been in a slightly different mindset as a result of the reorganization, and were  
 more concerned about how things would change in their daily job (e.g., who  
 they were going to collaborate with later that year, what unit they would  
 belong to, etc.). Change happens, but on this scale – once in a decade, maybe,  
 so it is not very often.

Quote 9     ID14: I feel that they [the senior management] have not been able to fully  
 handle the situation [with supporting line managers as part of the training],  
 which I believe—yet again—is the result of the timing. If it was not for the

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reorganization that was occurring in the midst of everything, then I think the senior management would have focused more on supporting us.

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## Discussion

This study focuses on the outcomes of iLead, an intervention training healthcare managers' generic implementation leadership. Results showed that managers perceived the content, as well as the pedagogy of the intervention to be relevant and of high quality. Moreover, they perceived that their knowledge about implementation leadership had increased throughout the intervention. However, behavioral effects were mixed. The employee transition ratings on the progress regarding the implementation and the leading of it indicated an improvement. This was mirrored in the interviews in narratives about altered ways of thinking about implementation and how to lead it. Despite our attempt to facilitate transfer by contextualizing iLead, by offering interventions to both first-line and senior managers (chief operating manager and second-line managers) from one organization and working on the same implementation case, no difference between the two intervention groups in implementation leadership or its increase over time could be found.

According to previous literature transfer of training may be facilitated when there is a common understanding about implementation, alignment across hierarchical levels and social support among colleagues and from senior managers [34–36,48]. Based on this, the interviews with managers provided insight into why the contextualization of iLead might not have resulted in the anticipated boosting effect.

First, first-line managers' attitudes regarding the common implementation case (decided by the senior management) were clearly mixed. Some embraced it, others were opposed to it, and that had been so for a long time: The implementation had been ongoing for some years with several setbacks. The fact that senior management made it mandatory to focus on this specific



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2  
3 1 implementation case in the iLead intervention caused frustration. Thus, it seems likely that the  
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5 2 readiness for the implementation case differed between the intervention groups. Managers in  
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7 3 group 1, who were free to choose their implementation case, possibly experienced higher  
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9 4 readiness for their implementation case than managers from group 2, who were expected to  
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11 5 work with a particular implementation. This may have decreased the managers' ability to  
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13 6 make the most out of the exercises in the iLead intervention, which resulted in reoccurring  
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15 7 discussions about the feasibility of the implementation case in the workshops for group 2.  
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17 8 This presents the challenge of separating attitudes and experiences of the leadership training  
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19 9 and its contextualization from the attitudes and experiences of the implementation case.  
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24 10 Nevertheless, it also points toward the importance of the fit between the perceived needs of  
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26 11 the organization and the evidence-based practice that is implemented [e.g., 2,49,50].  
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28 12 Moreover, there also needs to be a shared perception of managers on different levels  
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30 13 regarding the importance of implementing the evidence-based practice under question. Hence,  
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32 14 even when the focus of an intervention is on implementation leadership such as iLead, rather  
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34 15 than a specific evidence-based practice [e.g., 13,14], it may still be necessary to offer support  
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36 16 to the organizations and participating managers to ensure the feasibility of the implementation  
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38 17 case before accepting participants for this kind of intervention.  
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42 18 Second, major organizational change concurrently occurred with the intervention. In group  
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44 19 2, managers described conflicting focus, both for themselves and for employees, due to major  
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46 20 organizational change (merging or closure of units, change in first-line managers as well as  
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48 21 change of employees within units). However, managers from group 1 also experienced  
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50 22 organizational changes, yet they reacted differently. They mentioned the changes, but did not  
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52 23 pay as much attention to them, nor did they describe them as a major hindrance in  
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54 24 participating in the intervention and conducting the implementation. Yet, in group 1, attrition  
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56 25 was higher, which might have been a consequence of a conflicting focus.  
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3 1 The impact of managers' attitudes toward the common implementation and the timing of  
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5 2 the iLead intervention and organizational change in group 2 may be elucidated by research on  
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7 3 mental models [34]. Mental models concern underlying psychological beliefs, which affect  
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9 4 participants' reactions and behaviors. Even though the quantitative evaluation of the iLead  
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11 5 intervention revealed positive reactions, the interviews indicated mixed—in some cases,  
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13 6 critical—beliefs regarding the implementation case and the timing of the organizational  
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15 7 change. For an intervention and its implementation to be effective, the participants should  
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17 8 believe that there is a problem that the intervention is suitable to address, which motivates  
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19 9 them to participate in the intervention activities [51]. Whereas no difference in intrinsic  
20  
21 10 motivation to participate in iLead was found between the two intervention groups, extrinsic  
22  
23 11 motivation was higher in group 2 (analysis can be obtained from the authors). This is possibly  
24  
25 12 a consequence of senior management making both the training and the implementation case  
26  
27 13 mandatory for the first-line managers.  
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33 14 Third, when whole organizations undergo an intervention, the group dynamics and existing  
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35 15 organizational culture is brought into the intervention. Consequently, skeptical or conflicting  
36  
37 16 mental models about the intervention or the implementation case can receive more attention  
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39 17 and need to be addressed. For example, for group 2, workshop leaders had to spend more time  
40  
41 18 on managing issues that originated from the organizational context (e.g., the skeptical attitude  
42  
43 19 toward the common implementation case). In addition, in the contextualized group senior  
44  
45 20 management took part in an intervention of their own, aiming to support first-line managers.  
46  
47 21 However, this support was only partly perceived by first-line managers. Even though senior  
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49 22 management themselves developed through this intervention [for more information, see 52], it  
50  
51 23 did not result in a sufficient alignment between organizational levels. The timing of the senior  
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53 24 management intervention in relation to first-line managers' intervention may have been  
54  
55 25 suboptimal. Important discussions that would have had the potential to facilitate the  
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3 1 implementation process, if issued earlier, emerged among senior management during their  
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5 2 intervention. More preparation time to define the implementation case and senior  
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7 3 management's role in supporting first-line managers in their implementation process might  
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9 4 have been beneficial and should be adjusted in future multi-level interventions [52].  
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12 5 In sum, although contextualization may theoretically have several benefits, such as  
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14 6 providing social support, direction and alignment of the implementation to boost transfer, this  
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16 7 study highlights several impeding factors that may have outbalanced these potentially  
17  
18 8 beneficial effects. A more thorough organizational analysis prior to the intervention to  
19  
20 9 identify barriers for the intervention and the implementation case is recommended. Hence, the  
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22 10 general implementation and group climate, the history with the implementation case and the  
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24 11 structure and opportunities to perform in line with the implementation should be investigated,  
25  
26 12 along with participants' capacity and readiness for this implementation. Based on this  
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28 13 analysis, preparatory workshops for the actual intervention should be provided. Even though  
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30 14 the content of the parallel first-line manager and senior management interventions should be  
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32 15 retained, more elements fostering the dialog between the different managerial levels should be  
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34 16 included [52].  
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### 42 **Strengths and limitations**

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44 19 This study has several strengths that should be highlighted. First, iLead is a generic  
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46 20 intervention that is theory driven and has been developed involving relevant stakeholders  
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48 21 (e.g., line and senior management). It is based on the FRLM, which mirrors relevant  
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50 22 leadership behaviors that were also previously identified in implementation research [5–  
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52 23 10,26]. As it has been highlighted that general active leadership is not sufficient to reach  
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54 24 specific results (e.g., a successful implementation) [20,53], iLead focuses on active  
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56 25 implementation leadership. Second, to evaluate iLead, a sophisticated longitudinal  
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1 multisource design has been applied using both quantitative and qualitative data, which made  
2 it possible to capture the intervention context and ongoing process to understand the effects of  
3 iLead. Third, evaluation was facilitated by the iLead scale [54], capturing implementation  
4 leadership of the specific implementation case. The scale was specifically developed for this  
5 purpose, as it has been highlighted that the utilized evaluation criterion needs to be aligned  
6 with the intervention content [55]. The iLead scale can also be a useful tool in practice to  
7 provide managers with feedback regarding their implementation leadership.

8 The current study has also some shortcomings that must be acknowledged. First, the  
9 recruitment processes for the intervention and assignment to the two intervention groups  
10 might have introduced a systematic bias. Randomization of managers was not possible, and  
11 we cannot exclude that intervention groups differed systematically. Moreover, drop out varied  
12 between the groups, which might have affected the generalizability of results, particularly for  
13 group 1. Furthermore, the lack of randomization makes it impossible to separate effects of  
14 time from effects of the intervention, hence, an evaluation framework and multiple data  
15 sources were used to mitigate the risk of erroneous conclusions. Second, some outcomes  
16 (reactions and learning) relied on self-reports, which can be biased through common method  
17 bias [56,57]. Third, to investigate behavior change as an effect of the iLead intervention  
18 transition rating questions were used. Transition ratings are ascribed to overestimate effect  
19 sizes [58] as well as being influenced by the present state bias [59,60]. These biases could  
20 however not be found in a recent study comparing different ways of assessing change [61]. A  
21 traditional pre-post evaluation measurement was not feasible for several reasons. First, the  
22 iLead scale [45] could only be administered at the two follow up measurements because  
23 managers were still undecided regarding their implementation case when the baseline  
24 measurement was conducted pre intervention. Moreover, a comparison of overall mean  
25 changes pre-post intervention might not to be feasible in iLead, where each manager's work

1 took its starting point in her/his specific stage of her/his specific implementation case to  
2 assure the perceived usability of the intervention. Even in the contextualized intervention  
3 group, where the same implementation case was a focus, local conditions varied and led to  
4 different time plans. Hence, timely aligned of measurement with managers' individual change  
5 processes [62] is challenging with individualized interventions when the implementation  
6 process does not follow the time frame of the intervention; that is, when managers differ in  
7 their implementation progress and, therefore, vary in their ability to show implementation  
8 leadership. In addition, managers set individual leadership goals based on their strengths,  
9 weaknesses and work group needs. While probably beneficial for the individual participant,  
10 tailoring the intervention to the participants created a large variation of goals and pace in the  
11 implementation. Fourth, healthcare organizations are fast-moving entities with high turnover  
12 [63], resulting in changes in the work unit composition across measurement times manifesting  
13 in different sample sizes for the analyses. Only a smaller group could be followed across all  
14 three time points. In addition, whereas iLead focused on active implementation leadership,  
15 recent research shows that destructive leadership has detrimental effects [20,64]; hence,  
16 including how to decrease passive leadership in leadership trainings is another avenue for  
17 future research.

## 19 **Conclusions**

20 This study shows that a generic implementation leadership training that is based on the  
21 FRLM may lead to positive outcomes in participating managers' reactions and  
22 implementation knowledge. However, it also shows how hard it is to achieve transfer from  
23 training to behavioral change. Efforts to support transfer through contextualization was not  
24 successful. Potential explanations are offered by interview data, which suggest a counter  
25 effect of impeding organizational factors. Hence, contextualization may not be sufficient to

1 counterbalance such factors, calling for a thorough organizational analysis to identify  
2 hindering factors for the implementation beforehand.

#### 4 **Abbreviations**

5 FRLM - full range leadership model

6 EBP - evidence-based practice

#### 8 **Acknowledgements**

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18 the official views of AFA Insurance.

#### 20 **Ethical approval and consent**

21 All procedures were approved by the regional research ethics committees in Stockholm,  
22 Sweden (ref no. 2015/857-31/5). Written informed consent was obtained for all study  
23 participants.

25 **Patient consent** Not required.

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## Availability of data and materials

The analyzed dataset used for this study is available from Dr. Anne Richter (anne.richter@ki.se) on reasonable request.

## Consent for publication

Not applicable

## Competing interests

The authors declare that they have no competing interests.

## Authors' contribution

AR: Study conception and design, Acquisition of data, Analysis and interpretation of data, Drafting of manuscript, Critical revision

CL: Analysis and interpretation of data, Drafting of manuscript, Critical revision

HH: Study conception and design, Acquisition of data, Analysis and interpretation of data, Drafting of manuscript, Critical revision

UVTS: Study conception and design, Acquisition of data, Analysis and interpretation of data, Drafting of manuscript, Critical revision

RL: Interpretation of Data, Drafting of manuscript, Critical revision

RM: Analysis and interpretation of data, Drafting of manuscript, Critical revision

TH: Interpretation of Data, Critical revision

UES: Acquisition of qualitative data, Analysis and interpretation of qualitative data

All authors approved the final version.

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**References:**

- 1 Damschroder LJ, Goodrich DE, Robinson CH, *et al.* A systematic exploration of differences in contextual factors related to implementing the MOVE! weight management program in VA: A mixed methods study. *BMC Health Serv Res* 2011;**11**:248–61.
- 2 Aarons G, Hurlburt M, Horwitz SM. Advancing a conceptual model of evidence-based practice implementation in public service sectors. *Adm Policy Ment Health* 2011;**38**:4–23.
- 3 Kitson AL, Rycroft-Malone J, Harvey G, *et al.* Evaluating the successful implementation of evidence into practice using the PARiHS framework: theoretical and practical challenges. *Implement Sci* 2008;**3**:1–12.
- 4 Gifford W, Holyoke P, Squires JE, *et al.* Managerial leadership for research use in nursing and allied health care professions: a narrative synthesis protocol. *Syst Rev* 2014;**3**:57–64.
- 5 Reichenpfader U, Carlford S, Nilsen P. Leadership in evidence-based practice: a systematic review. *Leadersh Heal Serv* 2015;**28**:298–316.
- 6 Sandstrom B, Borglin G, Nilsson R, *et al.* Promoting the implementation of evidence-based practice: a literature review focusing on the role of nursing leadership. *Worldviews Evid Based Nurs* 2011;**8**:212–23.
- 7 Avolio BJ, Reichard RJ, Hannah ST, *et al.* A meta-analytic review of leadership impact research: Experimental and quasi-experimental studies. *Leadersh Q* 2009;**20**:764–84.
- 8 Wong C, Cummings GG, Ducharme L. The relationship between nursing leadership and patient outcomes: a systematic review update. *J Nurs Manag* 2013;**21**:709–24.

- 1  
2  
3 9 Eisenbach R, Watson K, Pillai R. Transformational leadership in the context of  
4 organizational change. *J Organ Chang Manag* 1999;**12**:80–9.  
5  
6  
7 10 Ovretveit J. Improvement leaders: what do they and should they do? A summary  
8 of a review of research. *Qual Saf Health Care* 2010;**19**:490–2.  
9  
10  
11 11 McMillen J, Raffol M. *Characterizing the Quality Workforce in Private U.S.*  
12 *Child and Family Behavioral Health Agencies*. 2015.  
13  
14  
15 12 Fixsen DL, Blase KA, Naoom SF, *et al*. Core Implementation Components. *Res*  
16 *Soc Work Pract* 2009;**19**:531–40.  
17  
18  
19 13 Aarons GA, Ehrhart MG, Farahnak LR, *et al*. Leadership and organizational  
20 change for implementation (LOCI): a randomized mixed method pilot study of a  
21 leadership and organization development intervention for evidence-based practice  
22 implementation Crossing the Quality Chasm: A New Health System for. *Implement Sci*  
23 2015;**10**:1–12.  
24  
25  
26 14 Gifford W a, Davies BL, Graham ID, *et al*. Developing Leadership Capacity for  
27 Guideline Use : A Pilot Cluster Randomized Control Trial. *Worldviews Evid Based*  
28 *Nurs* 2012;**10**:51–65.  
29  
30  
31 15 Richter A, von Thiele Schwarz U, Lornudd C, *et al*. iLead-a transformational  
32 leadership intervention to train healthcare managers' implementation leadership.  
33 *Implement Sci* 2016;**11**:108–21.  
34  
35  
36 16 Proctor EK, Chambers DA. Training in dissemination and implementation  
37 research: a field-wide perspective. *Transl Behav Med* 2016;**7**:624–35.  
38  
39  
40 17 Chambers DA, Proctor EK, Brownson RC, *et al*. Mapping training needs for  
41 dissemination and implementation research: lessons from a synthesis of existing  
42 D&I research training programs. *Transl Behav Med* 2016;**7**:593–601.  
43  
44  
45 18 Bass BM, Avolio BJ. Transformational leadership: A response to critiques. In:  
46  
47  
48  
49  
50  
51  
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58  
59  
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1  
2  
3 Chemers MM, Aymanm R, eds. *Leadership theory and research: Perspectives and*  
4 *directions*. San Diego, CA, US: : Academic Press Inc 1993. 49–80.

7 19 Avolio BJ. *Full range leadership development*. Thousand Oaks, CA: : SAGE  
8 Publications, Incorporated 2011.

11 20 Judge TA, Piccolo RF. Transformational and transactional leadership: a meta-  
12 analytic test of their relative validity. *J Appl Psychol* 2004;**89**:755–68.

15 21 Wang G, Oh I-S, Courtright SH, *et al*. Transformational leadership and  
16 performance across criteria and levels: A meta-analytic review of 25 years of research.  
17 *Gr Organ Manag* 2011;**36**:223–70.

19 22 Lowe KB, Kroeck KGG, Sivasubramania N, *et al*. Effectiveness correlates of  
20 transformational and transactional leadership: A meta-analytic review of the mlq  
21 literature. *Leadersh Q* 1996;**7**:385–425.

23 23 Dum Dum UR, Lowe KB, Avolio BJ. A Meta-Analysis of Transformational and  
24 Transactional Leadership Correlates of Effectiveness and Satisfaction: An Update and  
25 Extension. In: Avolio BJ, Yammarino FJ, eds. *Transformational and Charismatic*  
26 *Leadership: The Road Ahead 10th Anniversary Edition*. Emerald Group Publishing  
27 Limited 2013. 39 – 70.

29 24 Degroot T, Kiker DS, Cross TC. A Meta-Analysis to Review Organizational  
30 Outcomes Related to Charismatic Leaders h i p. 2000.

32 25 Battilana J, Gilmartin M, Sengul M, *et al*. Leadership competencies for  
33 implementing planned organizational change. *Leadersh Q* 2010;**21**:422–38.

35 26 Gifford W, Davies B, Edwards N, *et al*. Managerial leadership for nurses' use of  
36 research evidence: an integrative review of the literature. *Worldviews Evid Based Nurs*  
37 2007;**4**:126–45.

39 27 Collins DB, Holton EF. The effectiveness of managerial leadership development  
40

1  
2  
3 programs: A meta-analysis of studies from 1982 to 2001. *Hum Resour Dev Q*  
4  
5 2004;**15**:217–48.

6  
7 28 Lacerenza CN, Reyes DL, Marlow SL, *et al.* Leadership training design,  
8  
9 delivery, and implementation: A meta-analysis. *J Appl Psychol* 2017;**102**:1686–718.

10  
11 29 Lornudd C, Bergman D, Sandahl C, *et al.* A randomised study of leadership  
12  
13 interventions for healthcare managers. *Leadersh Heal Serv* 2016;**29**:358–76.

14  
15 30 Georgenson DL. The Problem of Transfer Calls for Partnership. *Train Dev J*  
16  
17 1982;**82**:75.

18  
19 31 Grossman R, Salas E. The transfer of training: what really matters. *Int J Train*  
20  
21  
22 *Dev* 2011;**15**:103–20.

23  
24 32 Baldwin TT, Ford JK. Transfer of Training: A Review and Direction for Future  
25  
26 Research. *Pers Psychol* 1988;**41**:63–105.

27  
28 33 Blume BD, Ford JK, Baldwin TT, *et al.* Transfer of Training: A Meta-Analytic  
29  
30 Review. *J Manage* 2009;**36**:1065–105.

31  
32 34 Nielsen K, Randall R. Opening the black box: Presenting a model for evaluating  
33  
34 organizational-level interventions. *Eur J Work Organ Psychol* 2013;**22**:601–17.

35  
36 35 Hill NS, Seo M-G, Kang JH, *et al.* Building Employee Commitment to Change  
37  
38 Across Organizational Levels: The Influence of Hierarchical Distance and Direct  
39  
40 Managers' Transformational Leadership. *Organization Sci* 2011;**23**:758–77.

41  
42 36 Biron C, Karanika-Murray M, Cooper C. *Improving organizational*  
43  
44 *interventions for stress and well-being: Addressing process and context.* London: :  
45  
46 Routledge 2012.

47  
48 37 Kirkpatrick D. Great ideas revisited. Techniques for evaluating training  
49  
50 programs. Revisiting Kirkpatrick's four-level model. *Train Dev* 1996;**50**:54–9.

51  
52 38 Blamey A, Mackenzie M. Theories of Change and Realistic Evaluation: Peas in  
53  
54  
55  
56  
57  
58  
59  
60

1  
2  
3 a Pod or Apples and Oranges? *Evaluation* 2007;**13**:439–55.

4  
5 39 von Thiele Schwarz U, Richter A, Hasson H. Getting everyone on the same  
6 page: Co-created Program Theory. In: Nielsen K, Noblet A, eds. *Implementing and*  
7 *evaluating organizational interventions*. Routledge 2018. 42–67.

8  
9  
10 40 Ivankova N V, Creswell JW, Stick SL. Using Mixed-Methods Sequential  
11 Explanatory Design: From Theory to Practice. *Field methods* 2006;**18**:3–20.

12  
13 41 Freedman DS, Thornton A, Camburn D. Maintaining Response Rates In  
14 Longitudinal Studies. *Sociol Methods Res* 1980;**9**:87–98.

15  
16 42 Fridrich A, Jenny GJ, Bauer GF. Development of a generic process appraisal  
17 scale for organizational health intervention elements. *Manuscr Submitt Publ* 2016.

18  
19 43 Eklof M, Hagberg M. Are simple feedback interventions involving workplace  
20 data associated with better working environment and health? A cluster randomized  
21 controlled study among Swedish VDU workers. *Appl Ergon* 2006;**37**:201–10.

22  
23 44 Hasson H, Gilbert-Ouimet M, Baril-Gingras G, *et al*. Implementation of an  
24 organizational-level intervention on the psychosocial environment of work: comparison  
25 of managers' and employees' views. *J Occup Environ Med* 2012;**54**:85–91.

26  
27 45 Mosson R, Von Thiele Schwarz U, Hasson H, *et al*. How do iLead? Validation  
28 of a scale measuring active and passive implementation leadership in Swedish  
29 healthcare. *BMJ Open* 2018;**8**.

30  
31 46 Raudenbush SW, Bryk AS. *Hierarchical Linear Models: Applications and Data*  
32 *Analysis Methods*. Thousand Oaks, CA: : Sage 2002.

33  
34 47 Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol*  
35 2006;**3**:77–101.

36  
37 48 von Thiele Schwarz U, Hasson H, von Thiele Schwarz U, *et al*. Alignment for  
38 Achieving a Healthy Organization. In: Bauer GF, Jenny GJ, eds. *Salutogenic*

1  
2  
3 *organizations and change*. Dordrecht: : Springer Netherlands 2013. 107–25.

4  
5 49 Fixsen DL, Naoom SF, Blase KA, *et al*. Implementation research: A synthesis  
6 of the literature. Tampa, FL: 2005.

7  
8  
9  
10 50 Damschroder LJ, Aron DC, Keith RE, *et al*. Fostering implementation of health  
11 services research findings into practice: a consolidated framework for advancing  
12 implementation science. *Implement Sci* 2009;**4**:50.

13  
14  
15  
16  
17 51 NytrØ K, Saksvik PØ, Mikkelsen A, *et al*. An appraisal of key factors in the  
18 implementation of occupational stress interventions. *Work Stress* 2000;**14**:213–25.

19  
20  
21 52 Hasson H, Lornudd C, von Thiele Schwarz U, *et al*. Supporting Senior  
22 management to enhance the effectiveness of a Line Manager Training Program. In:  
23 Nielsen K, Noblet A, eds. *Implementing and evaluating organizational interventions*.  
24 Taylor and Francis 2018. 169–94.

25  
26  
27  
28  
29  
30 53 Bass BM, Avolio BJ, Jung DI, *et al*. Predicting unit performance by assessing  
31 transformational and transactional leadership. *J Appl Psychol* 2003;**88**:207–18.

32  
33  
34  
35  
36  
37  
38  
39  
40 54 Mosson R, von Thiele Schwarz U, Hasson H, *et al*. How do iLead? Validation  
41 of a scale measuring active and passive implementation leadership in Swedish  
42 healthcare. *BMJ Open* 2018;**8**:e021992.

43  
44  
45  
46  
47 55 Taylor PJ, Russ-Eft DF, Taylor H. Transfer of management training from  
48 alternative perspectives. *J Appl Psychol* 2009;**94**:104–21.

49  
50  
51  
52  
53 56 Cote JA, Buckley MR. Measurement Error and Theory Testing in Consumer  
54 Research: An Illustration of the Importance of Construct Validation. *J Consum Res*  
55 1988;**14**:579–82.

56  
57  
58  
59  
60 57 Podsakoff PM, MacKenzie SB, Lee J-Y, *et al*. Common method biases in  
behavioral research: A critical review of the literature and recommended remedies. *J  
Appl Psychol* 2003;**88**:879–903.

1  
2  
3 58 Schmitt J, P Di Fabio R. The Validity of Prospective and Retrospective Global  
4 Change Criterion Measures. *Arch Phys Med Rehabil* 2006;**86**:2270–6.

5  
6  
7 59 Middel B, de Greef M, Jongste MJL, *et al.* Why Don't We Ask Patients With  
8 Coronary Heart Disease Directly How Much They Have Changed After Treatment? *J*  
9 *Cardiopulm Rehabil* 2002;**22**:47–52.

10  
11  
12 60 Mcphail S, Comans T, Haines T. Evidence of disagreement between patient-  
13 perceived change and conventional longitudinal evaluation of change in health-related  
14 quality of life among older adults. *Clin Rehabil* 2010;**24**:1036–44.

15  
16  
17 61 Meyer T, Richter S, Raspe H. Agreement between pre-post measures of change  
18 and transition ratings as well as then-tests. *BMC Med Res Methodol* 2013;**13**:52.

19  
20  
21 62 Zapf D, Dormann C, Frese M. Longitudinal studies in organizational stress  
22 research: a review of the literature with reference to methodological issues. *J Occup*  
23 *Health Psychol* 1996;**1**:145–69.

24  
25  
26 63 National Board of Health, Welfare. Competence maintenance and patient safety-  
27 How deficits in staffing and competence affect patient safety [Kompetensförsörjning  
28 och patientsäkerhet-Hur brister i bemanning och kompetens påverkar  
29 patientsäkerheten]. Stockholm: 2018.

30  
31  
32 64 Kelloway EK, Mullen J, Francis L. Divergent effects of transformational and  
33 passive leadership on employee safety. *J Occup Health Psychol* 2006;**11**:76–86.

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**Figure legend**

– Figure 1. Evaluation design for iLead

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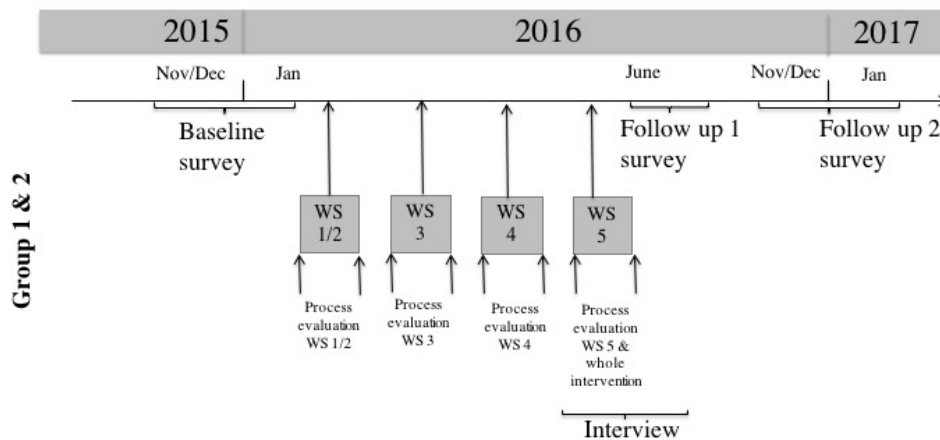


Figure 1. Evaluation design for iLead

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Intervention content

<b>Workshops 1&amp;2 Implementation and leadership 2 x 3 hours</b>	<b>Workshop 3 Communicating the implementation 3 hours</b>	<b>Workshop 4 Supporting the implementation 3 hours</b>	<b>Workshop 5 Sustaining the implementation 3 hours</b>
Aim: use an evidence-based model on implementation and connect leadership to it as an implementation strategy	Aim: inspirational and motivational communication of the implementation	Aim: understand and handle employee reactions to the implementation	Aim: planning for sustainability of the implementation
Introduction to the implementation model based on the Behavioral Change Wheel  Applying the model to a current implementation  Introduction to the full range leadership model  Receiving the 180 degree on feedback report on general and implementation-	Follow-up on the between-workshop assignment  Action plan finalization – identifying, pin-pointing and analyzing manager implementation leadership behaviors to enable and facilitate employee target behaviors  Introduction to inspirational motivation	Follow-up on the between-workshop assignment  Repetition of the steps in the implementation model  Understanding employee reactions and resistance to implementation  Training of possible implementation leadership behaviors to overcome resistance and to support the	Follow-up on the between-workshop assignment  Apply the implementation model to a fictive example  Action plan follow-up and revision focusing on evaluation and follow up.  Introduction to continuously evaluating the implementation progress.

<p>specific leadership behaviors, understanding and analyzing feedback on implementation leadership</p> <p>Action plan initiation – identifying, pin-pointing and analyzing employee target behaviors of the implementation</p> <p>Assignment to work with between Workshops 1/2 and 3: discuss the results of the feedback report with the employees &amp; discuss one’s own prerequisites for implementation leadership with senior manager</p>	<p>Training of inspirational and motivational communication in relation to the action plan</p> <p>Assignment to work with between Workshops 3 and 4: Present the action plan to the senior manager as well as employees, that will be involved in the implementation. Act in line with the action plan.</p>	<p>implementation</p> <p>Introduction to contingent reward, intellectual stimulation and individual consideration</p> <p>Revision of the action plan</p> <p>Assignment to work with between Workshops 4 and 5: Act according to the action plan, evaluate the progress related to the implementation. Testing contingent reward, intellectual stimulation and individual consideration. Identify potential obstacles with the action plan.</p>	<p>Focus on intervention sustainment – measuring and monitoring change, conducting adaptations</p> <p>Transform the action plan into a sustainability plan</p>
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Core components that are used in all workshops:

Work with one’s own implementation case
Short expert lectures presenting state-of the art research
Individual as well as reflection in small groups
Role-play
Individual feedback from employees, i.e., 180-degree feedback in feedback report
Feedback from fellow training participants
Feedback from workshop leaders

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Work between the workshops
Booster email between the workshops

For peer review only

## Appendix 1. Interview guide

### Introduction:

Can you describe your role as a manager?

### Transfer of knowledge to practice:

-What have you learnt from the training? How have you used what you have learnt in the training?

-Have you learnt something during the training that you are keen to use related to your leadership? Something that stands out as particularly important?

-Which parts of the training did you perceive to good and where there parts that were missing?

-Have you had the chance to use what you have learnt during the training? Can you provide examples?

-Can you recall a work situation when it worked well to use what you learnt in the training? What do you think was the reason for why it went well?

-Do you think there will be more of these situations where you will be able to use the things you learnt in the training?

-Where there situations where you used something from the training in a different way? Did that result in the desired outcome? And why?

-Have you experience difficulties in using what you have learnt in the training in your practice?

-Have you experienced conflicts between the training and your workplace/practice when you have tried to use the new leadership behaviors?

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3 -Have you experienced something in you or your situation that can make it more difficult to  
4 use these new leadership behaviors?  
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8 -Can you recall a work situation when it did not work well to use what you have learnt in the  
9 training? What do you think was the reason for this?  
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12 -What could facilitate that you can use the knowledge from the training? Factors in you or  
13 your workplace?  
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15  
16 -How much effort have you invested to try using what you have learnt in the training?  
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18  
19 -Did you receive the support that you would have needed to use what you learnt in the  
20 training? What and which aspects have been supporting?  
21

22  
23 -If not, which support would you have needed to be able to use what you have learnt in the  
24 training at your workplace?  
25

26  
27 -Do you experience that the training has change your or others way of thinking about the  
28 implementation? Can you give concrete examples?  
29

30  
31 -Do you experience that the training has changed your or others behavior at your workplace?  
32 Can you give concrete examples?  
33

34  
35 -If you experienced change, is the change only related to this concrete implementation you  
36 were working on or your leadership in general? Has your leadership changed over and above  
37 the current implementation?  
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47 **Attitudes:**

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49 -Was it possible to transfer what you learnt in the training to your colleagues/employees at  
50 your unit?  
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53 -What was easier and more challenging in that translation work? Which parts have worked  
54 and which did not?  
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3 -Was there a specific person that was particular supportive/hindering when it comes to  
4 spreading your knowledge?  
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7  
8 -What do you think your second line manager and senior management would have needed to  
9 support your and your employees' change?  
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11  
12 -What in the training was the most important part for you to be able to transfer your  
13 knowledge from the training into practice?  
14

15  
16 -Did you miss something in the training? What would you have needed to transfer what you  
17 have learned to your workplace/employees?  
18

19  
20 -Is there something else that you have been thinking about related to the training?  
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### 26 **Effects of the training:**

27  
28 -Do you monitor what you have been working on? What do you do?  
29

30  
31 -How much help and support was the training to your implementation process on a scale from  
32 1 to 10? Can you further develop why it was a [number between 1 and 10].  
33

34  
35 -How well did your action plan work at your workplace on a scale from 1 to 10? Can you  
36 further develop why it was a [number between 1 and 10].  
37

38  
39 -To what extent was the intervention plan translated into practice on a scale from 1 to 10? Can  
40 you further develop why it was a [number between 1 and 10].  
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### 46 **Context:**

47  
48 -Was there something in the organization or context that affected your work with the  
49 implementation and leading the implementation?  
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## STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation	Page No
<b>Title and abstract</b>	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	1
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	1
<b>Introduction</b>			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	3-5
Objectives	3	State specific objectives, including any prespecified hypotheses	6
<b>Methods</b>			
Study design	4	Present key elements of study design early in the paper	7
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	7
Participants	6	(a) <i>Cohort study</i> —Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up <i>Case-control study</i> —Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls <i>Cross-sectional study</i> —Give the eligibility criteria, and the sources and methods of selection of participants	7-9
		(b) <i>Cohort study</i> —For matched studies, give matching criteria and number of exposed and unexposed <i>Case-control study</i> —For matched studies, give matching criteria and the number of controls per case	
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	12-13
Data sources/measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	9-10
Bias	9	Describe any efforts to address potential sources of bias	24-25
Study size	10	Explain how the study size was arrived at	8-9
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	14
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	14
		(b) Describe any methods used to examine subgroups and interactions	14
		(c) Explain how missing data were addressed	14
	9	(d) <i>Cohort study</i> —If applicable, explain how loss to follow-up was addressed <i>Case-control study</i> —If applicable, explain how matching of cases and controls was addressed <i>Cross-sectional study</i> —If applicable, describe analytical methods taking account of sampling strategy	
		(e) Describe any sensitivity analyses	-



Continued on next page

<b>Results</b>			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	9
		(b) Give reasons for non-participation at each stage	9
		(c) Consider use of a flow diagram	9
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	7-8
		(b) Indicate number of participants with missing data for each variable of interest	9,15,16-18
		(c) <i>Cohort study</i> —Summarise follow-up time (eg, average and total amount)	9
Outcome data	15*	<i>Cohort study</i> —Report numbers of outcome events or summary measures over time	9,12
		<i>Case-control study</i> —Report numbers in each exposure category, or summary measures of exposure	-
		<i>Cross-sectional study</i> —Report numbers of outcome events or summary measures	-
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	15,16-18
		(b) Report category boundaries when continuous variables were categorized	-
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	-
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	21
<b>Discussion</b>			
Key results	18	Summarise key results with reference to study objectives	20
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	22-25
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	25
Generalisability	21	Discuss the generalisability (external validity) of the study results	22-25
<b>Other information</b>			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	25

\*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

**Note:** An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at [www.strobe-statement.org](http://www.strobe-statement.org).