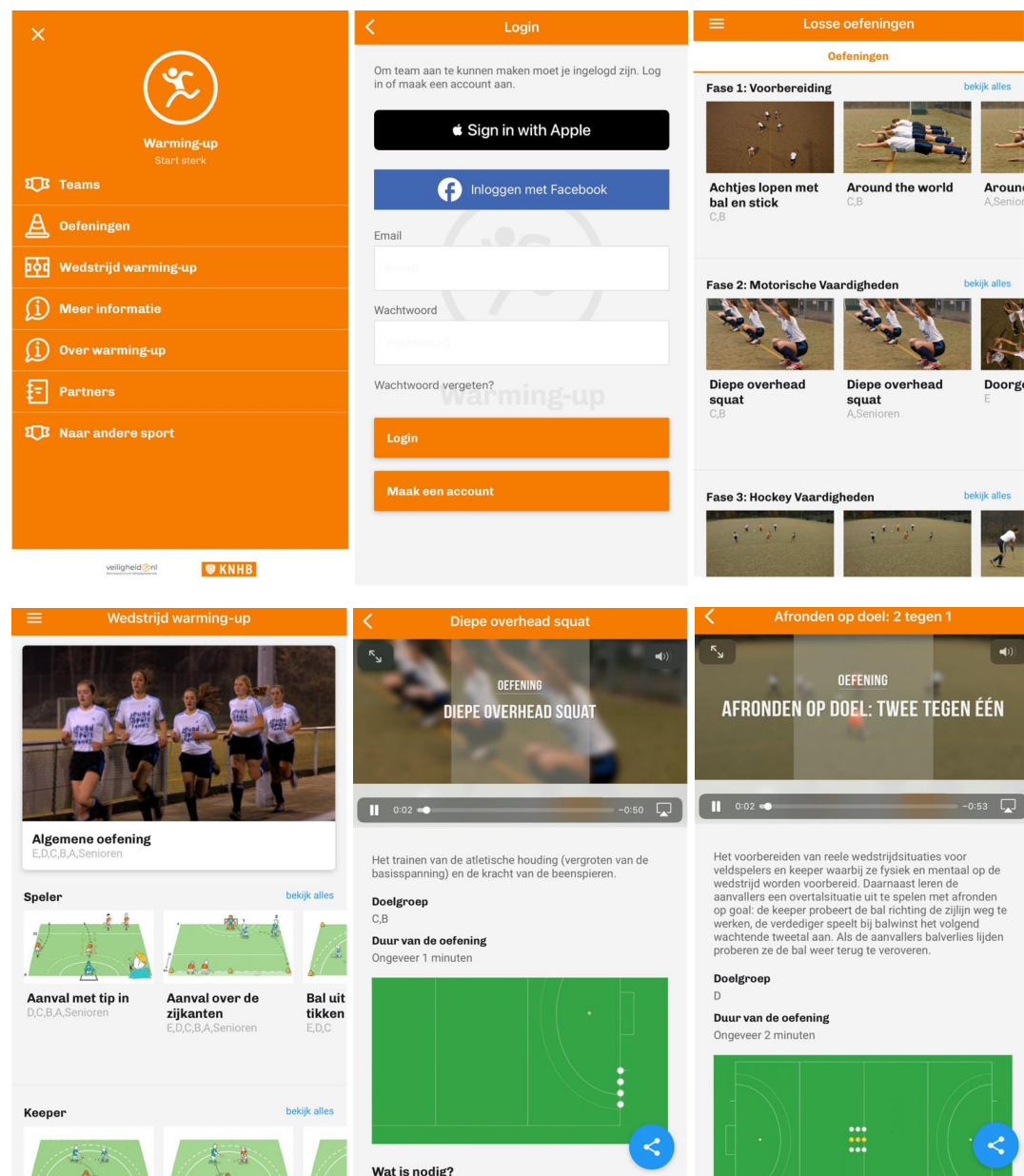


Supplementary materials

Appendix I Screenshots of the WUP app

The WUP intervention for field hockey players available through a smartphone/tablet



Appendix II Timeline implementation actions per channel KNHB

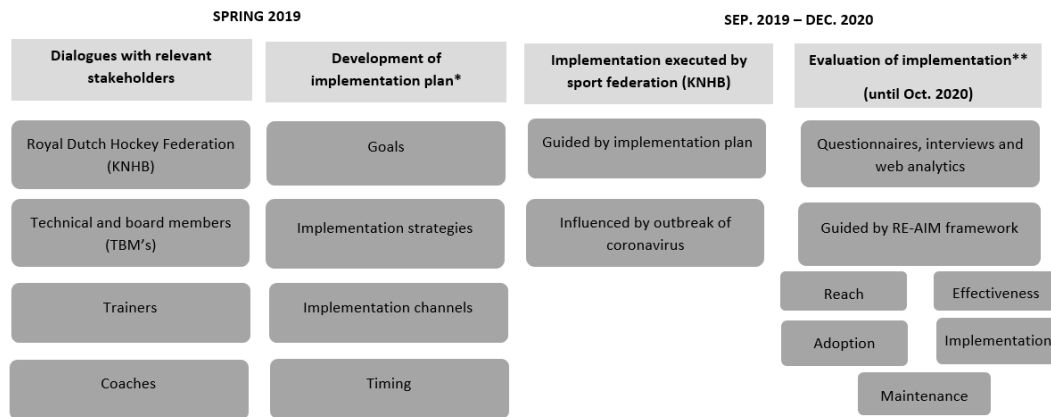
Timeline implementation actions per channel

	6 2019	7 2019	8 2019 START	9 2019	10 2019	11 2019	12 2019	1 2020	2 2020	3 2020 COVID	4 2020 COVID	5 2020 COVID	6 2020 COVID	7 2020 COVID	8 2020 COVID	9 2020 COVID	10 2020 COVID	11 2020 COVID	12 2020 COVID
WUP				Back-ground info				Push notification/popup	Push notification/popup								Push notification/popup		
Digital newsletter	Clubs			TBM + clubs		Clubs			Clubs	TBM									
Mailing			Clubs						Former WUP users										
Website KNHB																			
Website hockey.nl																			
Network meeting TBM's*																			
Masterclass tr/co** + TBM																			
Post(s) Facebook																			
Post(s) Instagram																			
Post(s) Twitter																			
Post LinkedIn																			
Webinar(s)																			
Training courses KNHB																			

*TBM=technical/board member club
 **tr/co=trainer/coach

Appendix III Overview of implementation process and evaluation

Overview of implementation process and evaluation



*See for more information Table 1

**See for more information Table 2

Appendix IV Overview of methods, participants, timing and components RE-AIM

Overview of methods used, participants, timing and components of RE-AIM framework

Method	Participants	Timing	RE-AIM*								
			Reach	Effectiveness		Adoption		Implementation		Maintenance	
			WUP	WUP	IS	WUP	IS	WUP	IS	WUP	IS
Baseline questionnaire (T0)	WUP users** who wanted to participate in research	New users between Sept. 2019 and Mar. 2020		All	All		All	Tr/co		Tr/co	
Follow-up questionnaires (T1, T2, T3)	WUP users who completed T0 (until two weeks before the timing of the follow-up questionnaire)	Dec. 2019 (T1***), April 2020 (T2), Oct. 2020 (T3)		All	All	Tr/co	All				
Mix between baseline T0 and T1 questionnaire	WUP users who did not complete T0 and new WUP users from April 2020 onwards (late entrants)	June 2020 (users who did not complete T0 or registered from April-June 2020), Oct. 2020 (users who did not complete any questionnaire or registered from June 2020 onwards)		All	All	Tr/co	All		TBM	Tr/co	
Questionnaire about WUP in training course	Trainers/coaches who participated in KNHB training course 2019-2020	June 2020, Oct. 2020									
Interviews	KNHB****	Dec. 2019									
		Oct. 2020									
	Technical/board members	Oct. 2020									
	Trainers/coaches	Oct. 2020									
Online analytics	-	Sept. 2019 until Dec. 2020									

*For most of the components of the RE-AIM framework, a distinction was made between WUP (Warming-up) and IS (implementation strategies). See also Table 2.

**WUP users consisted of trainers/coaches (tr/co) and technical board/management (TBM).

***T1 questionnaire was not sent to TBMs due to lack of response

****KNHB= Royal Dutch Hockey Federation

Appendix V Questionnaires

Following-up questionnaires (T1, T2, T3) of TBM excluded in overview due to lack of participants. TBMs only filled in the baseline questionnaire (T0) or late entrant questionnaire (LE).

Respondent characteristics:

Question	Questionnaire*	Target group	Answer options
Gender	T0, LE	Trainers/coaches + TBM	Man/woman
Age	T0, LE	Trainers/coaches + TBM	Age in years
Position	T0, LE	Trainers/coaches + TBM	Trainer/coach/trainer and coach
Team gender	T0, LE	Trainers/coaches	Boys/girls/mixed
Team category	T0, LE	Trainers/coaches	A-team/B-team/C-team/D-team/E-team

*T0=baseline questionnaire, LE=late entrant questionnaire

Reach: -

Effectiveness:

WUP

Subject question	Questionnaire*	Target group	Answer options
General satisfaction**	T1, T2, LE	Trainers/coaches	Scale 1 (completely dissatisfied) – 10 (very satisfied)
	LE	TBM	
	KNHB students	Trainers/coaches who participated in KNHB training course	Scale 1 (completely dissatisfied) - 5 (very satisfied)
User-friendliness**	T1, T2, LE	Trainers/coaches	Scale 1 (completely not user-friendly) – 10 (very user-friendly)
	LE	TBM	
Perception of impact***	T0, T1, T2, T3, LE	Trainers/coaches + TBM	Scale 1 (completely disagree) – 7 (completely agree)

*T0=baseline questionnaire, T1=first follow-up questionnaire, T2=second follow-up questionnaire, T3=third follow-up questionnaire, LE=late entrant questionnaire.

**Since T2 is only partly completed by one trainer/coach, this question was not answered at T2 and it was not needed to average the scores of T1 and T2.

***Answers of two trainers/coaches were averaged: one trainer/coach (partly) filled in T0 and T1 (scoring 6 and 5) and one trainer/coach (partly) filled in T0 and T3 (scoring 6 and 4).

Implementation strategies

Subject question	Questionnaire*	Target group	Answer options
Satisfaction**/**	T0, T1	Trainers/coaches	Scale 1 (completely dissatisfied) – 7 (very satisfied) + not applicable <ul style="list-style-type: none"> • Article/messages • Video • Infographic • Banner • Flyer/leaflet • Poster • Other material:
	T0	TBM	
General satisfaction***	T2, LE	Trainers/coaches	Scale 1 (completely dissatisfied) – 7 (completely satisfied)
	LE	TBM	
	KNHB students	Trainers/coaches who participated in KNHB training course	Scale 1 (completely dissatisfied) – 10 (very satisfied)
Clarity of message	T2, LE	Trainers/coaches	Scale 1 (completely dissatisfied) – 7 (completely satisfied)
	LE	TBM	
	KNHB students	Trainers/coaches who participated in KNHB training course	Scale 1 (completely dissatisfied) – 10 (very satisfied)
	T2, LE	Trainers/coaches	

Feeling addressed by the message	LE	TBM	Scale 1 (completely dissatisfied) – 7 (completely satisfied)
	KNHB students	Trainers/coaches who participated in KNHB training course	Scale 1 (completely dissatisfied) – 10 (very satisfied)
Clearness of utility WUP in message	T2, LE	Trainers/coaches	Scale 1 (completely dissatisfied) – 7 (completely satisfied)
	LE	TBM	
	KNHB students	Trainers/coaches who participated in KNHB training course	Scale 1 (completely dissatisfied) – 10 (very satisfied)

*T0=baseline questionnaire, T1=first follow-up questionnaire, T2=second follow-up questionnaire, LE=late entrant questionnaire.

**It was not needed to aggregate the data of T0 and T1, since the trainers/coaches did not hear again/in another way of WUP at T1 and therefore could also not indicate their satisfaction.

***For trainer/coaches and TBMs these two outcomes were merged.

Adoption

WUP

Subject question	Questionnaire*	Target group	Answer options
WUP use in last four weeks***	T1, T2	Trainers/coaches	Yes, as a trainer/yes, as a coach/yes, as a trainer and coach/no
Time period WUP use***	LE (June 2020)	Trainers/coaches	No use/past 0-4 weeks/past 5 weeks or longer
WUP use season 2020-2021***	LE (Oct. 2020), T3	Trainers/coaches	Stopped WUP use/using WUP at this moment/did not use WUP, but planning to use it later on/did not use WUP and not planning to use it
WUP use	KNHB students	Trainers/coaches who participated in KNHB training course	Yes/no
Reasons non-use WUP****	T1, T2, LE, T3	Trainers/coaches	Club decided not to use WUP/did not meet my expectations/the team did not like it/did not fit my routine/WUP was not useful/WUP was not clear/WUP had no added value/WUP was not user-friendly/I forget to use it/lack of time to use WUP/not satisfied with WUP/WUP was not practical to use/other reason(s)**
Reason WUP use****	T0, LE (Oct. 2020), T3	Trainers/coaches	Getting inspired for new exercises/enhance knowledge about injury prevention/enhance skills on injury prevention/injury prevention players/spend less time on designing training session/other reason(s)**
Using WUP independently*****	T0, LE (Oct. 2020), T3	Trainers/coaches	Scale 1 (completely disagree) – 7 (completely agree)

*T0=baseline questionnaire, T1=first follow-up questionnaire, T2=second follow-up questionnaire, T3=third follow-up questionnaire, LE=late entrant questionnaire.

**Multiple answers possible.

***These data were merged and WUP use was per trainer/coach categorised as 'yes' or 'no', resulting in 'no' when in all questionnaires the trainer/coach indicated not to have used WUP.

****Answers from (baseline and) follow-up questionnaires were aggregated per trainer/coach: when a trainer/coach mentioned in multiple questionnaires the same reason why he/she used/did not use WUP, the frequency was counted as one. If reasons differed at different questionnaires, their frequency was also counted as one. E.g. when a trainer/coach answered in two questionnaires the reason for using WUP as 'getting inspired for new exercises' and in one questionnaire as well 'enhance knowledge about injury prevention', both reasons were counted as frequency one (i.e. reported as trainer/coach did use WUP for inspirational purposes and to enhance knowledge).

*****One trainer/coach responded to this question at T0 (score: 6) and T3 (score: 7). These answers were aggregated.

Implementation strategies

Subject question	Questionnaire*	Target group	Answer options
Organisation through which WUP users learned about WUP****	T0, T1**, T2**, LE, T3**	Trainers/coaches + TBM	KNHB/club/other organisation/don't know
How WUP users learned about WUP through KNHB****	T0, T1**, T2**, LE, T3**	Trainers/coaches + TBM	Digital newsletter/social media/website (KNHB or hockey.nl)/information meeting/event/webinar/masterclass/ mailing/training course/ other way***
How WUP users learned about WUP through club****	T0, T1**, T2**, LE, T3**	Trainers/coaches + TBM	Digital newsletter/social media/website/(digital) information meeting/event/ mailing/ from TBM/ other way***
How KNHB students learned about WUP	KNHB students	Trainers/coaches who participated in KNHB training course	In training course: yes/no If yes, indicate how: text on PPT slide and oral explanation by teacher/article/video/oral explanation by teacher/other***

*T0=baseline questionnaire, T1=first follow-up questionnaire, T2=second follow-up questionnaire, T3=third follow-up questionnaire, LE=late entrant questionnaire.

**In T1, T2 and T3 was asked if WUP users learned through the same or another organisation again about WUP and how.

***Multiple answers possible.

****Answers from baseline and follow-up questionnaires were aggregated per trainer/coach or TBM: e.g. when a trainer/coach or TBM mentioned in multiple questionnaires the same organisation through which they learned about WUP, the frequency was counted as one. If organisations differed at different questionnaires, their frequency was also counted as one. E.g. when a trainer/coach answered in two questionnaires the KNHB as an organisation through which he or she learned about WUP and in one questionnaire the hockey club, both organisations were counted as frequency one (i.e. reported as trainer/coach learned through KNHB and hockey club about WUP).

Implementation

WUP

Subject question	Questionnaire*	Target group	Answer options
Frequency of use WUP***	T1, T2 (last four weeks), LE (season)	Trainers/coaches	Scale 1 (in no training sessions/matches) – 5 (every training session/match)
Use of training scheme***	T1, T2, LE	Trainers	Yes/no, I used the exercises separately
Use of match warm-up***	T1, T2, LE	Coaches	No, separate exercises/yes, general exercises match warm-up/yes, players and/or keeper exercises match warm-up**

*T0=baseline questionnaire, T1=first follow-up questionnaire, T2=second follow-up questionnaire, T3=third follow-up questionnaire, LE=late entrant questionnaire.

** Multiple answers possible.

***Aggregation of data was not necessary, since the one trainer/coach who responded to T2 did not use WUP in the last four weeks and questions about frequency of use and use of training scheme and/or match warm-up were not asked.

Implementation strategies

Subject question	Questionnaire*	Target group	Answer options
Promoted WUP in club	LE (June 2020)*	TBMs	Yes, among trainers/yes, among coaches/yes, among other TBMs/no**

*LE=late entrant questionnaire

** Multiple answers possible

Maintenance

WUP

Subject question	Questionnaire*	Target group	Answer options
Intention to use WUP**	T0, LE (Oct. 2020), T3	Trainers/coaches	Scale 1 (completely disagree) – 7 (completely agree)
Intention to use WUP every training session/match**	T0, LE (Oct. 2020), T3	Trainers/coaches	Scale 1 (completely disagree) – 7 (completely agree)

*T0=baseline questionnaire, T3=third follow-up questionnaire, LE=late entrant questionnaire.

**Only one trainer/coach completed T0 and T3. At both time points the trainer coach indicated he/she would use WUP until the end of the hockey season (score: 5) and he/she would not use WUP in every training session/match (score: 3). These answers were aggregated.

Implementation strategies

-

Appendix VI Topic guide

Reach: -

Effectiveness:

WUP

Trainer/coach + TBMs:

- Satisfaction: To what extent are you satisfied with WUP?
 - What do you think was good and what could be improved? Any tips?
- Perception of impact: What did WUP bring you? Any advantages?
 - Did you notice a change in number of injuries in your player after you started using WUP?

Implementation strategies

Trainer/coach + TBMs:

- What did you think about the way you learned about the existence of WUP?

Adoption:

WUP

Trainer/coach:

- Users:
 - What made you use/keep using WUP?
 - What hindered your WUP use?
- Non-users: Could you tell me why you did not use WUP?

TBMs:

- To what extent WUP was used in your club? And why?

Implementation strategies

Trainer/coach + TBMs:

- Could you tell me how you learned about the existence of WUP?
- What did you think about the way you learned about this existence of WUP?
 - What did you think about the communication materials?

Implementation:

WUP

Trainer/coach:

- Could you tell me how frequently you used WUP?
 - Why this often?
- Did you change anything in the WUP exercises when your team performed them?
 - If yes, why? And what changes did you make?

Implementation strategies

Trainer/coach:

- Did you hear anything about WUP from your TBMs?
 - If no, did you notify them about WUP?
 - If yes, how did the TBMs communicate about WUP? And to whom?

TBMs:

- Did you promote WUP in your club?
 - If yes, how? What went well and what could be improved? What were your target groups?

KNHB:

- WUP
You optimised the WUP programme before launching it nationally.
 - How do you look back on this?
 - What went well and what could be improved?
 - Which factors played a role in this?
 - To what extent are you satisfied with WUP?
- Implementation WUP
How do you look back on the nationwide implementation of WUP?
 - Preparatory sessions
 - What did you think of these sessions?
 - What went well and what could be improved?
 - Start implementation
 - How did the start of the implementation go?
 - What went well and what could be improved?
 - During implementation
 - How did the execution of the implementation strategies go?
 - What went well and what could be improved?
 - Which factors played a role in this?
- If you could do the implementation all over again, what would you do differently?

Maintenance:WUP**Trainer/coach:**

- To what extent are you planning to use WUP for the rest of the field hockey season?
 - Why? What are you going to change? What will you retain?

Implementation strategies**Trainer/coach + TBMs:**

- To what extent do you think WUP should be integrated in the club policy in order to stimulate structural use?
 - How could this be done?

KNHB:

- How do you see the future of the implementation of WUP?
 - Which implementation strategies are you planning?
 - Which are possible hindering factors?
 - What do you need?

Appendix VII Codebook interviews

Effectiveness

Trainers/coaches

Factor	Description	Example
Satisfaction about using WUP	Mentions of positive or negative aspects of WUP regarding content or user-friendliness	<i>"WUP gave practical input for a warm-up. Exercises were good."</i>
Perceived added value	Mentions of positive consequences when using WUP (e.g. injury-preventive)	<i>"My team consists of really young players, who generally have fewer injuries. However, I think performing a good warm-up is important in order to prevent injuries."</i>

Adoption

Trainers/coaches – barriers and facilitators

Intervention

Factor	Description	Example
Stand-alone programme	Mentions of the influence of WUP as a website/app on the use of WUP	<i>"I think Warming-up is too specific to be a stand-alone app. I don't like having a different app for every aspect of field hockey."</i>
Satisfaction about using WUP	Mentions of positive or negative aspects of WUP regarding content or user-friendliness on the use of WUP	<i>"I had to keep logging in and it was problematic to select and add teams."</i>
Perceived added value	Mentions of positive consequences when using WUP (e.g. injury-preventive) on the use of WUP	<i>"My team consists of really young players, who generally have fewer injuries. However, I think performing a good warm-up is important in order to prevent injuries."</i>

Characteristics trainer/coach

Factor	Description	Example
'Know-it-all' trainers	Mentions of the influence of (assumed) knowledge of structuring a training on the use of WUP	<i>"A hindering factor for using WUP is the stubbornness of trainers. They think they know it all."</i>
Experience of trainers/coaches	Mentions of the influence of years of experience as a trainer/coach on the use of WUP	<i>"When you have a lot of experience, you won't use WUP as much, since you already know what exercises you can use."</i>
Volunteers	Mentions of being a volunteer (as a trainer/coach) on the use of WUP	<i>"Less experienced trainers, often volunteers, could use it, since it is a tailor-made programme."</i>

Other

Factor	Description	Example
COVID-19	Mentions of the influence of COVID-19 on the use of WUP (e.g. official regulations, mindset of trainer/coaches)	<i>"Due to corona we could not enter the field before the training or match. We had to do the warm-up faster than we normally do."</i>

Implementation

Trainers/coaches - WUP

Factor	Description	Example
Lack of intended implementation WUP	Mentions of adjustments made when using WUP (e.g. in the frequency of use or when performing the exercises)	<i>"I use different apps to prepare a training. I like doing it that way. Then, I can adapt the warm-up to the training and the weather conditions".</i>

Organisation (club and TBM) - barriers and facilitators

Factor	Description	Example
Lack of time and capacity within small clubs	Mentions of the influence of time and capacity (e.g. personnel to promote WUP) on the implementation of WUP within clubs	<i>"Bigger clubs have the opportunity to recruit employees to manage the implementation of WUP. In smaller clubs there are a few people who do everything."</i>
Lack of supervision of the use of WUP	Mentions of the influence of supervision on the use of WUP on the implementation of WUP within clubs	<i>"It is hard to check if the trainers/coaches actually use WUP. We can only check if they use the WUP exercises after two to three weeks."</i>
Enthusiasm TBM	Mentions of the influence of personal characteristics of TBMs on the implementation of WUP within clubs	<i>"It helps when a TBM is enthusiastic about WUP. It stimulates trainers/coaches to use WUP and it also helps with enthusing other TBMs."</i>
Informal communication within small clubs	Mentions of the influence of way of communication on the implementation of WUP within clubs	<i>"In a small club there is a lot of informal communication, for instance about WUP. It is easy to get in touch. I often play cards with the chair and often board members play in the same team."</i>
Need for information on injury prevention (lack of knowledge) within small clubs	Mentions of the influence of WUP on knowledge and its effect on implementation of WUP within clubs	<i>"Small clubs will especially benefit from WUP, since they have less knowledge about injury prevention than bigger clubs."</i>

Context (KNHB) (barriers and facilitators)

Factor	Description	Example
Delayed start of implementation	Mentions of the influence of the timing of the start of the implementation on the general implementation of WUP	<i>"The KNHB should reach trainers at least one or two weeks before the start of the new field hockey season, so they can integrate it in their plans."</i>
Difficulty in reaching TBMs	Mentions of the influence of the possibilities of reaching the target groups on the general implementation of WUP	<i>"The club receives a digital newsletter from the KNHB and usually sends it to all board members. [...], but the newsletter is not always read and there is a big gap between sending and reading."</i>
Non-binding of KNHB	Mentions of the influence of the role of the KNHB on the general implementation of WUP	<i>"The KNHB cannot make the use of WUP obligatory. In my opinion, the main goal of the KNHB is to facilitate field hockey in all its aspects."</i>
Lack of priority in communication, due to lack of interest in injury prevention	Mentions of the influence of the way of prioritising communication within KNHB on the general implementation of WUP	<i>"Injury prevention is not the most appealing subject for communication towards players. Especially for young players, they want to learn tricks, etc."</i>
Preparation of implementation	Mentions of the influence of the preparation process of implementation (e.g. organised	<i>"Our view is that of the KNHB. It was good to get to know other views on WUP in the implementation sessions,</i>

	sessions with stakeholders) on the general implementation of WUP	<i>e.g. from the trainers. Those insights could be used when designing an implementation plan."</i>
Employee capacity	Mentions of the influence of employee capacity within KNHB on the general implementation of WUP	<i>"The timing of the preparation of the implementation was during the summer holiday. Some colleagues were absent. Also, a colleague of the communication department was absent for quite a while during the implementation phase, which hindered implementation."</i>
COVID-19	Mentions of the influence of COVID-19 on the general implementation of WUP	<i>"When corona restrictions were eased, it was good timing for communicating about performing a warm-up."</i>
Perceived added value of implementation research	Mentions of the influence of implementation research on the general implementation of WUP	<i>"The implementation research leads to a sense of urgency to communicate about WUP. There is some pressure, which works. Also, it is nice to know which implementation strategies work. Normally we do not have enough time to investigate this extensively."</i>
Broad communication to different target groups	Mentions of the influence of targeted communication on the general implementation of WUP	<i>"Targeted communication is essential, since you do not want to keep 'bothering' them with WUP. Also, it helps when you integrate WUP into a broader whole: when you communicate not solely about WUP, but also about other related subjects."</i>
Monitoring implementation strategies	Mentions of the influence of tracking results of implementation strategies on the general implementation of WUP	<i>"It stimulates us to keep implementing WUP when we receive positive reactions on social media. Then we have the feeling we are on the right track."</i>

Maintenance

Trainers/coaches – WUP

Factor	Description	Example
WUP use in the upcoming field hockey season	Mentions of (continued) WUP use in the upcoming field hockey season	-

TBMs + KNHB - implementation

Factor	Description	Example
Promotion of WUP within club in upcoming field hockey season	Mentions of TBMs about the extent to which they plan to promote WUP in the upcoming field hockey season	<i>"I plan to promote WUP through our 'hockey school', since WUP is a useful platform. Most trainers/coaches don't know about it yet."</i>
Use of implementation strategies to promote WUP nationally in the upcoming field hockey season	Mentions of the KNHB about the (continued) use of implementation strategies in the upcoming field hockey season	<i>"The biggest impact we can make is by integrating WUP in the 'Knowledge Platform'."</i>

Appendix VIII: Number of WUP installs (app) per month and trend unique users a day (website + app)

