

# Projekt X:IT - Et empirisk eksempel, implementeringsforskning

## Oplæg til DIN møde 23. april 2018

Lotus Sofie Bast, post doc, Statens Institut for Folkesundhed

23. April 2018

# Program for i dag

- **X:IT 2010 – 2013: Hvad gjorde vi?**
  - Evalueringen
  - Implementeringsfokus
  
- **X:IT 2017 – 2020: Hvad gør vi nu?**
  - Evalueringen
  - Implementeringsfokus

# Projekt X:IT

- X:IT er en rygeforebyggende indsats til grundskolen
- Formål: at reducere andelen af nye rygere med 25 %
- Udviklet og implementeret af Kræftens Bekæmpelse
- Evalueret af Center for Interventionsforskning (CFI)

# De tre indsatslementer

- Udviklet på baggrund af litteratur om rygeforebyggelse i skolesettingen
- Røgfri skole
- Undervisning
- Forældreinddragelse
- Treårig indsats i 7.-9. klasse

# Den første evaluering af X:IT (2010-2013)

## Evalueringsdesign

- RCT med 53 I-skoler og 44 S-skoler (4.468 elever)

## Data

- **Effektevaluering**
  - Spørgeskemadata fra elever ved baseline, 1FU, 2FU, 3FU
  - Spørgeskemadata fra skole- og kommunekoordinatorer
- **Implementerings- og procesevalueringensdata**
  - Data i spørgeskemaer
  - Interviews med lærere, elever og forældre

## Effekten af X:IT

- **Effekt ved 1. opfølgning** (slutningen af 7. klasse)
  - OR (95% CI) for at være ryger når man går på en indsatssskole  
= **0.61** (0.45 – 0.82)
- **X:IT kan forebygge op mod 25% nye rygere**

## Effekten af X:IT - fortsat

- **Effekt ved 2. opfølgning** (slutningen af 8. klasse)
  - OR (95% CI) for at være ryger når man går på en indsatskole  
= 0.89 (0.63 – 1.24)
- **3. opfølgning** (slutningen af 9. klasse) – lærer lockout!!
  - Svarprocent under 40% - data ikke anvendt

Aftagende implementering over tid?

# Implementeringsfokus

- Tidligere skolebaserede indsatser til rygeforebyggelse har vist blandet effekt – manglende implementering?
- Undersøge om indsatsselementerne i X:IT var virksomme (for de der implementerede som tiltænkt)
- Om det kan implementeres i den virkelige verden



# Phd: The measurement and effect of implementation fidelity in the multi component smoking intervention: The X:IT study

- Overordnede mål:
  - Hvordan måle implementeringen kvantitativt?
  - Sammenhæng mellem implementering og effekt?
- Arbejde udført fra 2011 – 2016 (inkl. to barsler)
- Tre delstudier

## Paper 1, formål:

- Udvikle et samlet kvantitativt mål for implementering
- Undersøge hvordan X:IT var implementeret efter første og andet år
- Undersøge sammenhængen mellem implementering og elevrygning på skoleniveau

# Udvikle et samlet kvantitativt mål for implementering

- Ofte måles blot et af aspekterne af implementering, fx dose eller adherence
- Målet skulle rumme både strukturelle aspekter (fx dosis) og mere proces-orienterede (fx kvaliteten af det)

## Aspekter af implementering

- Adherence ✓ Core components **delivered**
- Dose ✓ **Amount** received by participants
- Quality of delivery ✓ **How** components were delivered
- Participant responsiveness ✓ **Involvement** of participants

Dane & Schneider, 1998; Durlak & Dupree, 2008

# Paper I

## Evaluation of implementation – data used in thesis

Aim	First follow-up (end of year 7)	Second follow-up (end of year 8)
Implementation index	50 x:it schools (98 %) 2,202 x:it pupils (87 %)	39 x:it schools (95 %) 1,748 x:it pupils (76 %)
Association to smoking	Aggregated data from 50 x:it schools (98 %) 40 control schools (95 %)	Aggregated data from 39 x:it schools (95 %) 37 control schools (97 %)

---

% of eligible schools and pupils in the X:IT study

**Table 2:** Overview of implementation fidelity measures and data sources of the X:IT study by program components: Smoke-free school grounds, smoke-free curriculum, and parental involvement.

Fidelity measures	Adherence	Dose	Quality of delivery	Participant responsiveness
-------------------	-----------	------	---------------------	----------------------------

	Adherence	Dose	Quality of delivery	Participant responsiveness
<b>Smoke-free curriculum</b>				
Definition	Eight mandatory lessons on smoking related issues delivered	Number of lessons on smoking related issues received	Quality assessment of 'Up in Smoke' (curriculum material)	Attitudes to teaching about smoking related issues
Measures (response categories)	For each school class, how many of these lessons did the class have? <i>(Mandatory eight lessons+ more vs. less+ none)</i>	How many hours of teaching did you have? <i>(None+ 1-3 hours+ 4-6 hours vs. 7-9 hours+ 10 hours or more)</i>	How well did the 'Up in Smoke' material work? <i>(Very well+ well vs. parts of it not so well+ not well+ not well at all+ didn't teach/use the material)</i>	How well did you like the lessons from the 'Up in Smoke' material? <i>(Very much+ okay vs. didn't like+ didn't like at all vs. no teaching)</i>
Data source	School coordinator questionnaire	Pupil questionnaire	School coordinator questionnaire	Pupil questionnaire
	<i>more vs. less+ none)</i>	<i>hours or more)</i>	<i>didn't teach/use the material)</i>	
Data source	School coordinator questionnaire	Pupil questionnaire	School coordinator questionnaire	Pupil questionnaire

- **Masse variable som målte implementering**
  - Skulle blive til ét samlet mål for implementering for hver skole

# Paper I

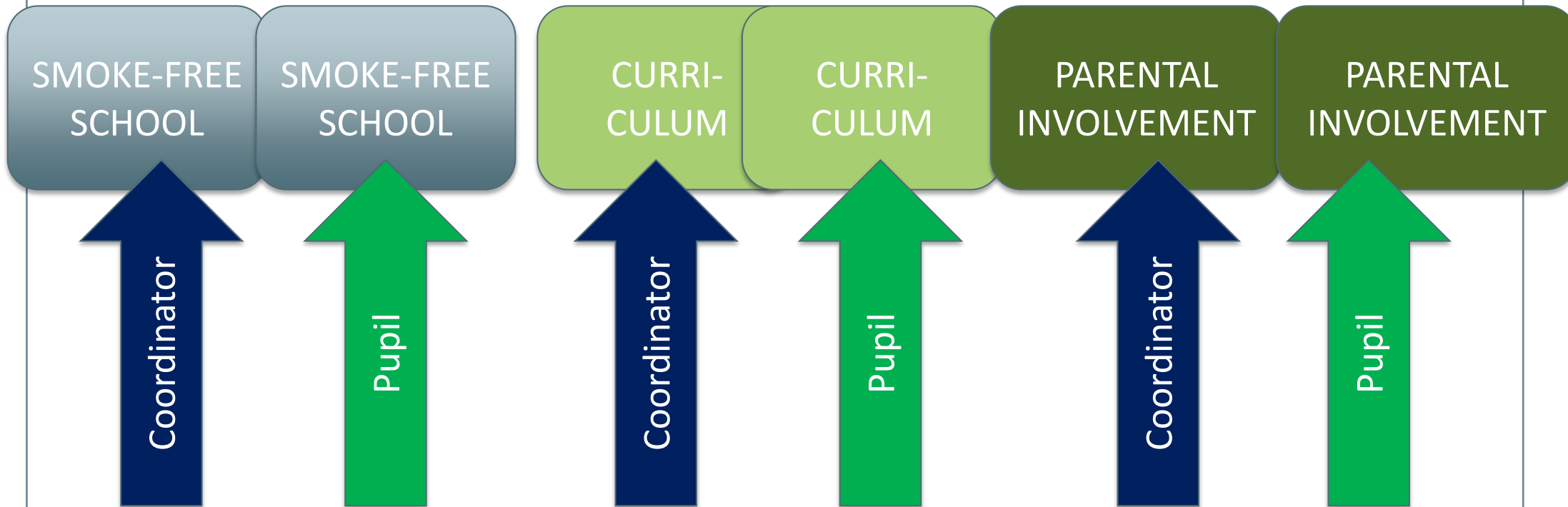
Combining items into one overall implementation measure?

One overall implementation  
measure??!



- Konceptuelt valg af hvilke variable, der skulle med
- Vigtigt at kunne skille implementeringen af de tre elementer ad
- Vigtigt både at inddrage elev og koordinatorsvar for et nuanceret billede

- Interventionskomponenter hver for sig
- Elev og koordinatorsvar hver for sig
- 6 mål for implementering på hver skole
- Komponenten var implementeret KUN hvis både koordinator og det aggregerede elev data sagde at det var implementeret



Efterfølgende tjek af indekset ved konfirmatoriske faktoranalyser, okay model-fit

# Paper I

## Implementeringsindeks

High implementation:	All three components
Medium implementation:	Two out of three components
Low implementation:	One or none of the components

# Implementeringsindeks

Tage højde for ændringer i implementering over tid.....

- 1) High implementation both years
- 2) High implementation combined with a year of medium or low implementation
- 3) Low or medium implementation both years

# Paper I: Results

Implementation of the X:IT intervention at first and second follow-up, including the combined implementation for both years

Implementation fidelity	First follow-up (50 schools)	Second follow-up (39 schools)
<b>High implementation</b> (all three components implemented*)	24.0% (12)	28.2% (11)
<b>Medium implementation</b> (two out of three components implemented)	44.0% (22)	23.1% (9)
<b>Low implementation</b> (one or zero components implemented)	32.0% (16)	48.7% (19)

# Komponentvis implementering over tid



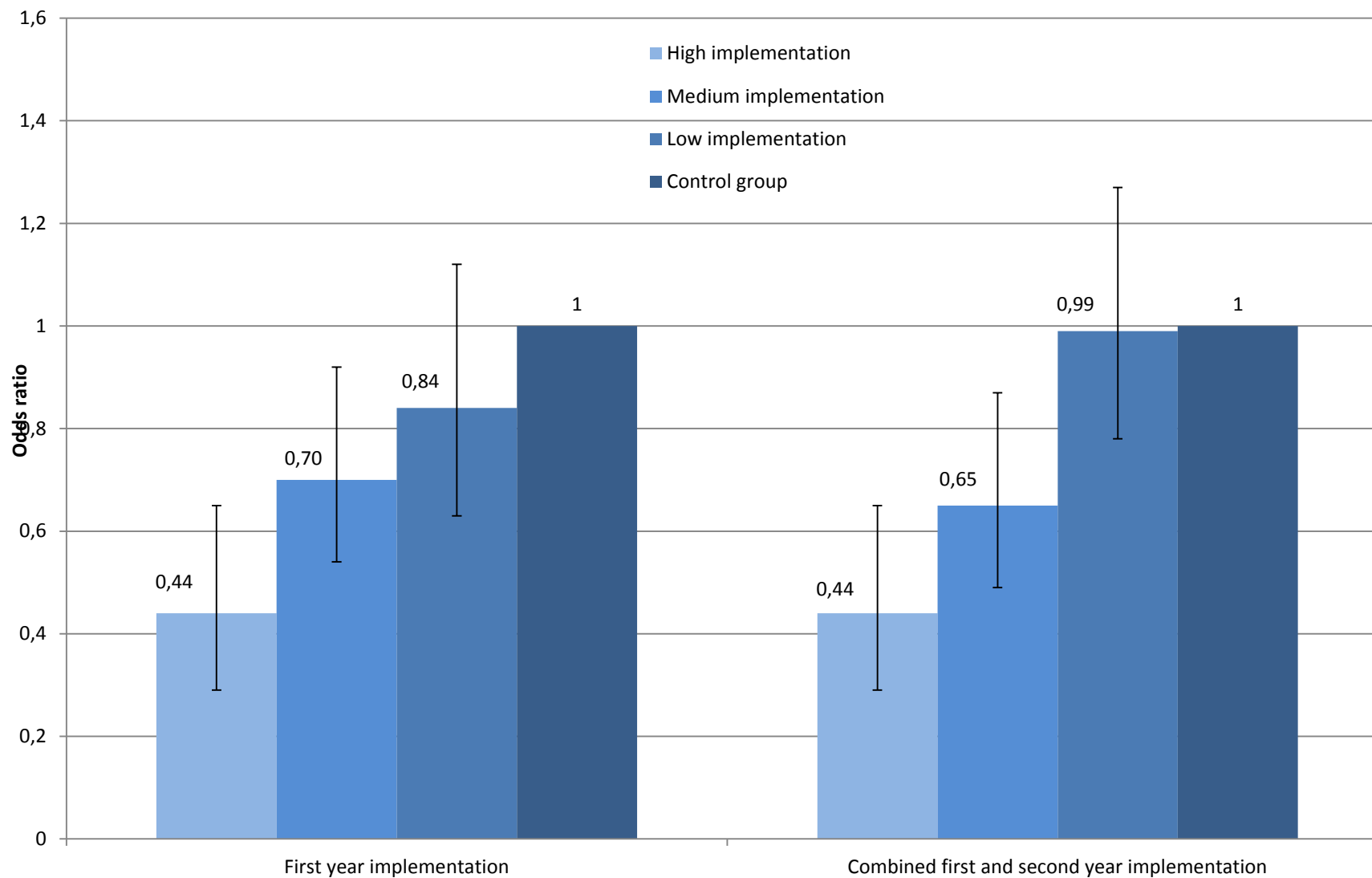
# Udfaldsmål: Rygning

## Hvor ofte ryger du nu (f.eks. cigaretter, pipe eller vandpipe)?

- (1)  Hver dag
- (2)  Ikke hver dag, men hver uge
- (3)  Ikke hver uge, men hver måned
- (4)  Sjældnere end hver måned
- (5)  Jeg ryger ikke

I denne artikel: Aggregeret elevdata – andelen af rygere på hver skole

# Paper I: Results: Association of implementation and current smoking





RESEARCH

Open Access

# High impact of implementation on school-based smoking prevention: the X:IT study—a cluster-randomized smoking prevention trial



Lotus Sofie Bast<sup>1\*</sup>, Pernille Due<sup>1</sup>, Pernille Bendtsen<sup>1</sup>, Lene Ringgard<sup>2</sup>, Louise Wohllebe<sup>2</sup>, Mogens Trab Damsgaard<sup>1</sup>, Morten Grønbaek<sup>1</sup>, Annette Kjær Ersbøll<sup>1</sup> and Anette Andersen<sup>1</sup>

## Abstract

**Background:** Implementation fidelity describes how well an intervention is implemented in the real-world setting. Assessing implementation fidelity is essential in the understanding of intervention results. In most studies, implementation fidelity is measured insufficiently, though, not taking into account the complexity of the concept nor the intervention.

The objective of the present study was to develop an overall quantitative measure of implementation fidelity, to examine the degree of implementation fidelity and the association of implementation and effect of a randomized school-based smoking prevention trial—the X:IT study.

**Methods:** A cluster-randomized trial testing is a multi-component intervention to prevent smoking among adolescents in 24 Danish elementary schools (12 intervention, 12 control schools). Participants were aged 7–12

## Paper 2, formål:

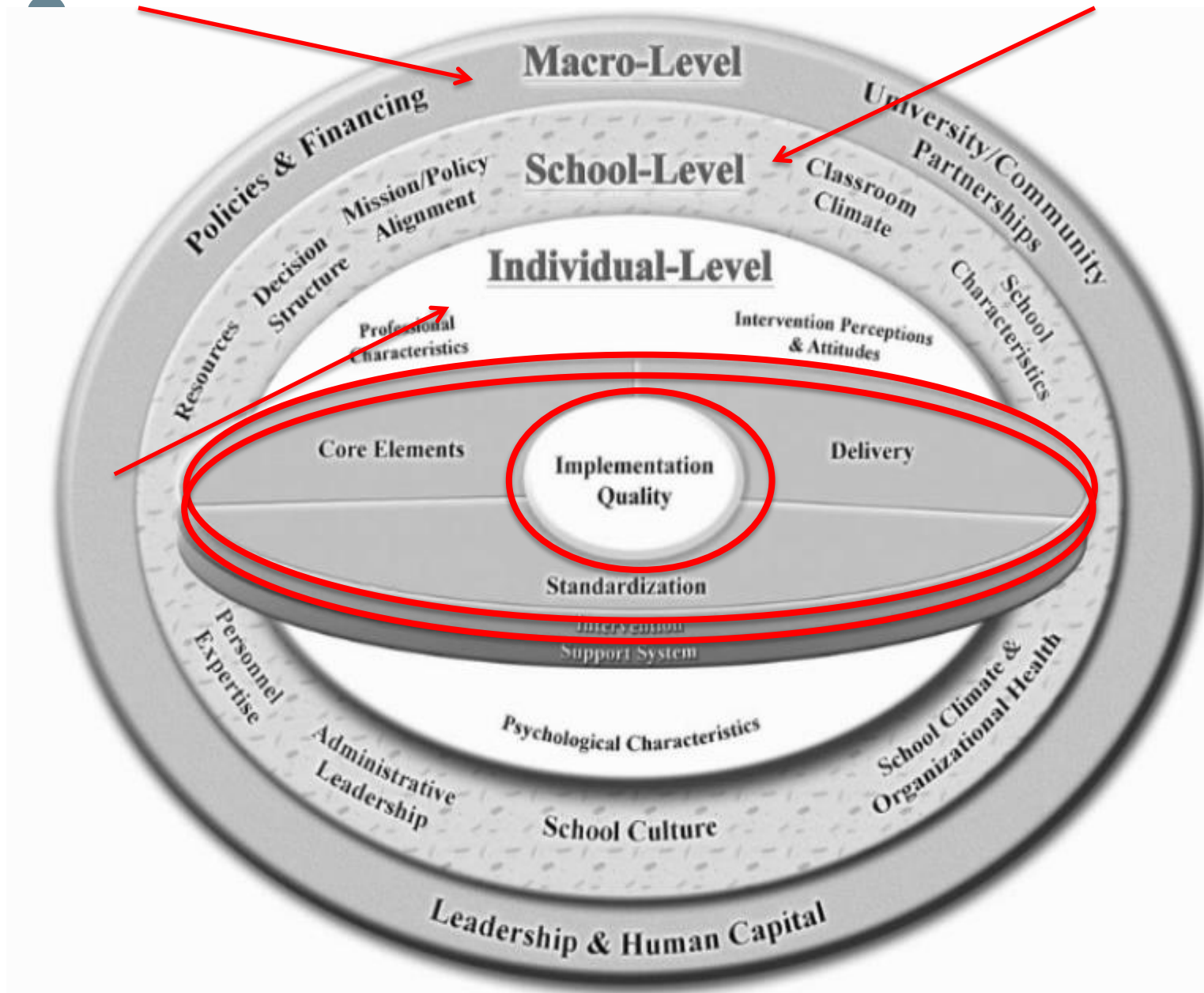
- Undersøge skolekarakteristika for skoler med høj, mellem og lav implementering, baseret på målet udviklet i paper 1

## Paper II

# Evaluation of implementation – data used in thesis

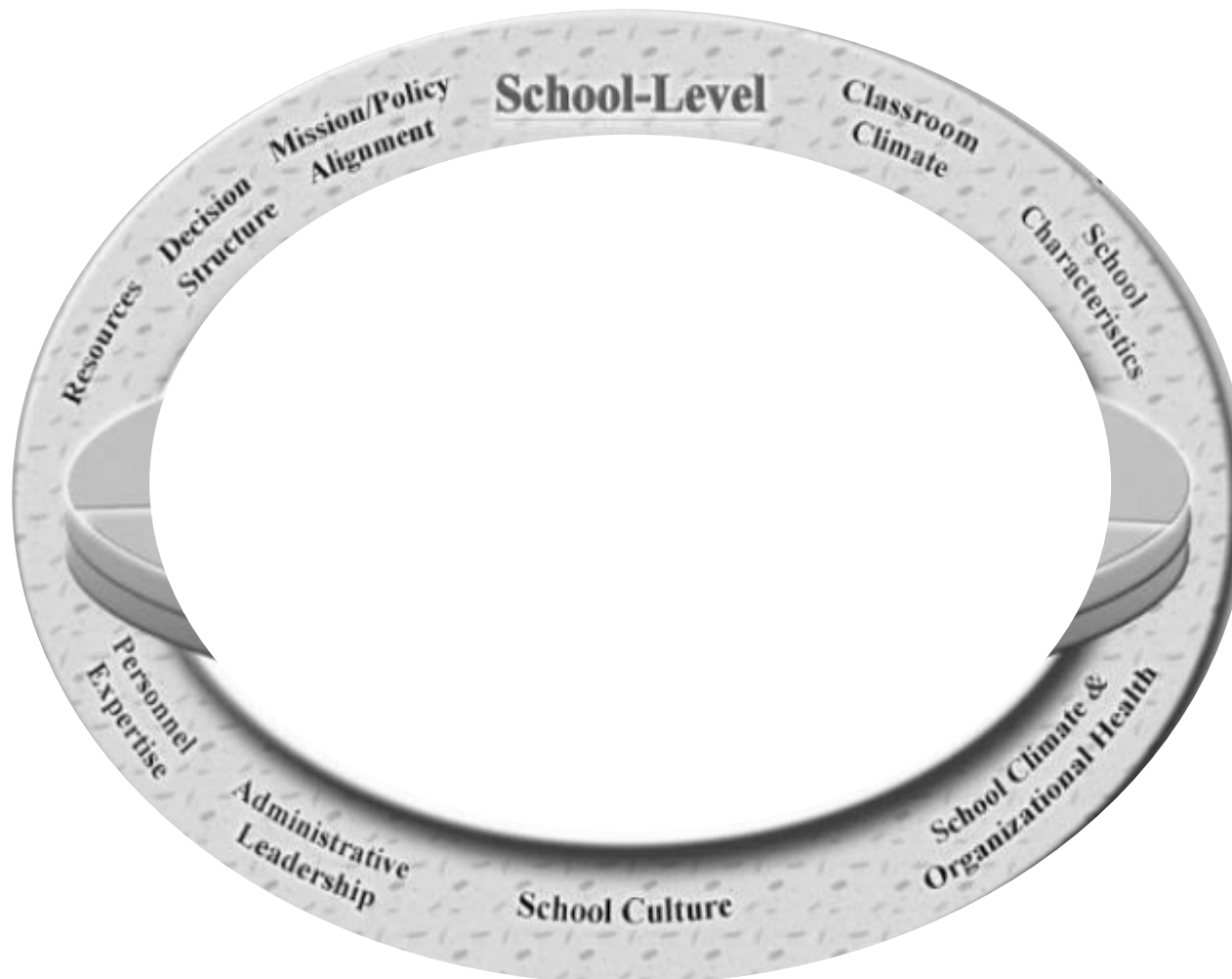
Aim	First follow-up (end of year 7)
School characteristics	49 x:it schools (96 %) 17 municipalities (100 %) 116 classes from x:it schools (96 %)

% of eligible schools and pupils in the X:IT study



Factors that may affect implementation quality: A multi-level model (Domitrovich et al. 2008)

# Paper II



# Paper II

**Table 3:** Conceptualizations of school level characteristics that can affect implementation quality, including dichotomizations and data sources.

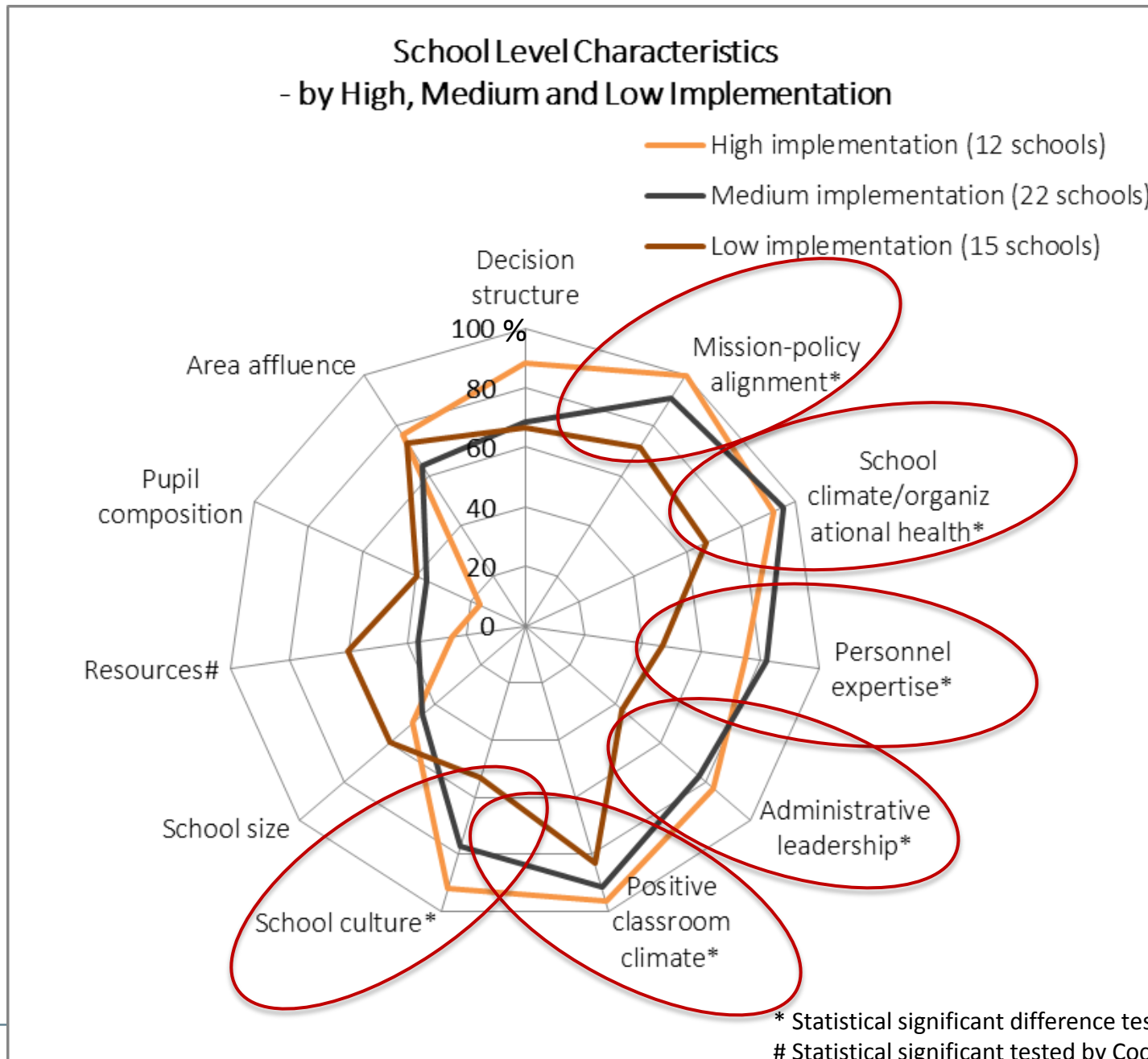
Characteristics that can affect implementation	Explanation according to Domitrovich et al. 2008	Measure in the X:IT study	Dichotomizations	Data source
<b>Mission-policy alignment</b>	Interventions that align directly with the school policy are more likely to be prioritized, implemented and sustained over time	<i>"The X:IT intervention is in accordance with our school values on smoking"</i>	Totally agree + agree vs. neither + disagree + totally disagree	School coordinator
<b>Decision structure</b>	Involvement of teachers in decision making decreases resistance to change and increases members' perceptions of successful program adoption	<i>"In your municipality; was it voluntary for the schools to participate in the X:IT intervention?"</i>	Yes vs. no	Municipal coordinator
<b>Resources</b>	For example stipends for training, dedicated staff time for prevention activities, space, equipment and other necessary program resources are a part of a school's capacity to implement an intervention	<i>"Did your municipality buy out the school coordinator at the X:IT intervention schools?"</i>	Yes vs. no	Municipal coordinator
<b>Personnel expertise</b>	The level of prevention expertise in the building, involvement of school personnel, availability of qualified staff, such as master teachers or coaches within the school or throughout the district	<i>"Besides the X:IT intervention; within the last couple of years did your school:"</i> - discuss smoking prevention at teacher meetings? - discuss smoking prevention at parents meetings? - discuss smoking prevention with pupils?	Yes vs. no + don't know (sum score 0-3) 0 vs. 1-3  If yes to one or more items the school has some prevention expertise	School coordinator
<b>Administrative leadership</b>	A strong and supportive leader can have significant influence on	<i>"Your leader supported:"</i> - the X:IT intervention	Totally agree + agree vs. neither + disagree + totally disagree	School coordinator

# Paper II

**Table 3:** Conceptualizations of school level characteristics that can affect implementation quality, including dichotomizations and data sources.

Characteristics that can affect implementation	Explanation according to Domitrovich et al. 2008	Measure in the X:IT study	Dichotomizations	Data source
<b>Mission-policy alignment</b>	Interventions that align directly with the school policy are more likely to be prioritized, implemented and sustained over time	<i>"The X:IT intervention is in accordance with our school values on smoking"</i>	Totally agree + agree vs. neither + disagree + totally disagree	School coordinator
<b>Decision structure</b>	Involvement of teachers in decision making decreases resistance to change and increases members' perceptions of successful program adoption	<i>"In your municipality; was it voluntary for the schools to participate in the X:IT intervention?"</i>	Yes vs. no	Municipal coordinator
<b>Resources</b>	For example stipends for training, dedicated staff time for prevention activities, space, equipment and other necessary program resources are a part of a school's capacity to implement an intervention	<i>"Did your municipality buy out the school coordinator at the X:IT intervention schools?"</i>	Yes vs. no	Municipal coordinator
<b>Personnel expertise</b>	The level of prevention expertise in the building, involvement of school personnel, availability of qualified staff, such as master teachers or coaches within the school or throughout the district	<i>"Besides the X:IT intervention; within the last couple of years did your school:"</i> - discuss smoking prevention at teacher meetings? - discuss smoking prevention at parents meetings? - discuss smoking prevention with pupils?	Yes vs. no + don't know (sum score 0-3) 0 vs. 1-3  If yes to one or more items the school has some prevention expertise	School coordinator
<b>Administrative leadership</b>	A strong and supportive leader can have significant influence on	<i>"Your leader supported:"</i> - the X:IT intervention	Totally agree + agree vs. neither + disagree + totally disagree	School coordinator

# Paper II: Results





RESEARCH ARTICLE

## Association of School Characteristics and Implementation in the X:IT Study—A School-Randomized Smoking Prevention Program

Lotus S. Bast Cand Scient San Publ, PhD, Pernille Due MD, Annette K. Ersbøll Cand Polyt IMM, Mogens T. Damsgaard, Anette Andersen MD, PhD

First published: 6 April 2017 | <https://doi.org/10.1111/josh.12500> | Cited by: 1

The X:IT project group thanks the participating schools, students, parents, teachers, principals, and c ... **More**



PDF

TOOLS

SHARE

### ABSTRACT

#### BACKGROUND

Assessment of implementation is essential for the evaluation of school-based preventive activities. Interventions are more easily implemented in schools if detailed instructional manuals, lesson plans, and materials are provided; however, implementation may also be affected by other factors than the intervention itself—for example, school-level characteristics

## Paper 3, formål:

- Undersøge sammenhæng mellem implementering og rygning på individniveau
- Udfordringen her: Intervention med tre indsatslementer, implementeret på hvert sit niveau
  - Røgfri skole på skoleniveau
  - Undervisning på klasseniveau
  - Røgfri aftaler og dialog på individniveau

<b>Intervention components</b>	<b>Respondents</b>	<b>Implementation level</b>	<b>Implementation fidelity % (n)</b>
Smoke-free school grounds	School coordinators	School	74.0 (37 schools)
Smoke-free school grounds	Pupils	School	83.2 (1787 pupils)
Mandatory curricular activities	Pupils	Class	85.0 (1824 pupils)
Parental involvement - Contract and dialogue	Pupils	Individual	65.6 (1407 pupils)
<b>Pupils exposed to the fully implemented intervention</b>		<b>Overall implementation at the individual level</b>	<b>38.8 (833 pupils)</b>

# I review i "Evaluation and Program Planning"

**Table 3:** Odds ratios (95% confidence intervals) for smoking by implementation of main components, compared to smoking at control schools at follow-up

Intervention components implemented		Number of pupils	Percent smokers (n)	Odds ratios (95% CI) Unadjusted	Odds ratios (95% CI) *Adjusted	<i>p-value Adjusted OR</i>
Control schools	Standard smoking prevention at control schools	1528	11.3 (172)	1.00 (Reference)	1.00 (Reference)	
-	No implementation	103	18.5 (19)	1.76 (0.97 – 3.20)	1.30 (0.67 – 2.55)	0.44
One component	Smoke-free school	86	16.3 (14)	1.44 (0.74 – 2.81)	1.11 (0.25 – 2.37)	0.79
	Mandatory curricular activities	269	20.8 (56)	<b>2.16 (1.40 – 3.34)</b>	<b>2.20 (1.41 – 3.43)</b>	<b>0.001</b>
	Parental involvement - Contract and dialogue	62	16.1 (10)	1.49 (0.70 – 3.20)	1.59 (0.70 – 3.62)	0.27
Two components	Smoke-free school + mandatory curricular activities	294	5.1 (15)	<b>0.41 (0.22 – 0.75)</b>	<b>0.44 (0.23 – 0.84)</b>	<b>0.012</b>
	Smoke-free school + contract and dialogue	107	3.7 (4)	<b>0.28 (0.10 – 0.81)</b>	0.36 (0.12 – 1.07)	0.065
	Contract and dialogue + mandatory curricular activities	392	8.9 (35)	0.87 (0.54 – 1.40)	0.89 (0.55 – 1.46)	0.65
Three components	Smoke-free school + mandatory curricular activities + contract and dialogue	833	2.6 (22)	<b>0.20 (0.12 – 0.34)</b>	<b>0.25 (0.15 – 0.42)</b>	<b>&lt;0.001</b>

\* Adjusted for differences in gender, family social position and baseline smoking status.

## Methodological considerations – the implementation index

- Mål for hvert aspekt (adhrence, dose...) giver vigtig viden om det ene aspekt, men ikke om det samlede billede af implementering
- Et samlet mål af adherence, dose, quality of delivery & participant responsiveness, med svar fra elever og skolekoordinatorer
- Strength: Nuanced picture of implementation
- Limitation: Association between aspects of implementation? Fx as moderators of each other

# Methodological considerations – the implementation index

- Implementering ændrer sig over tid – komplicerer målingen
  - Fx større strukturelle tiltag, her røgfri skole, tager længere tid at implementere end mere simple indsatser, fx undervisning
- For at tage højde for det – kombineret mål for første og andet år
  - 1) High implementation both years
  - 2) High implementation one year combined with a year of medium or low
  - 3) Low/medium implementation both years
- Styrke: En ren gruppe af high-implementers (konklusioner for de, der har gjort som beskrevet i projektet)
- Begrænsning: Rigtig mange skoler i medium/lav gruppen
  - Kender ikke effekten af medium implementering
  - Stigning vs et fald i implementering over tid – betydning for effekten?

# Anden evaluering af X:IT, (2017-2020) - med fokus på socialt differentielle effekter

- **På baggrund af resultater fra første evaluering**
  - Fx forældre anvendte ikke materialet hvis de selv var rygere
  - Mindre ressourcestærke forældre kunne ikke relatere til materialet, fx foto og sprogbrug
- **X:IT er tilrettet og evalueres igen**

# Anden evaluering af X:IT, (2017-2020) - med fokus på socialt differentielle effekter

- **Undervisningsmaterialet**
  - Lettere tilgængeligt online
  - Organiseret i temaer, som er lettere at gå til, behøver inddragelse fra færre lærere
  - KB udvikler letlæselige versioner af alle tekster så de bliver mere tilgængelige for fagligt svagere elever
- **Materiale rettet mod forældre**
  - Hjemmeside har flere indgange rettet mod dels rygende forældre, ikke rygende forældre og forældre med børn, der ryger
  - ‘Røgfri kontrakt’ → ‘Røgfri aftale’
  - ‘Røgfri dialog’ → ‘Snak om tobak’



## Status på evaluering af X:IT, 2017-2020

- **Rekruttering** forår 2017
  - 46 skoler indgår – alle som indsatskoler
- **Baselinemåling** efterår 2017 (start 7. klasse)
  - Opstartsworkshop – få skolerne godt fra start
- **Første follow-up** forår 2018 (slut 7. klasse)
- **Anden follow-up** forår 2019 (slut 8. klasse)
- **Tredje follow-up** forår 2020 (slut 9. klasse)
- Løbende registrering af undervisning gennem månedlige mails til koordinatore

# Status på evaluering af X:IT, 2017-2020

- **Baselinemåling**
  - 45 skolekoordinatorer har svaret (93,8 %)
  - 1975 elever har svaret (82,8 %)
- **Første follow-up udsendes 1. maj 2018**
- **Outcomes**
  - Cigaretter, snus, vandpipe, e-cig.....
- **Implementering**
  - 1. evaluering – stærkt fokus på implementeringsgrad
  - 2. evaluering – imp grad, nyt imp kapacitet

## Organisatorisk fokus - implementeringskapacitet

- Skolernes kapacitet til at implementere (fra projektets begyndelse) – evt. støtte de, der har mest brug for det?
- Domitrovich model + Scaccia et al. 2014 ( $R = M * C^2$ )
- (motivation – generel organisatorisk kapacitet - interventions-specifik kapacitet)
- Målt faktorer ved baseline, eksempler på næste slide

# Udvalgte eksempler

- **Motivation:**
  - Hvor enige er de fleste lærere på jeres skole i følgende udtalelser om rygeforebyggelse?
- **Program champion/innovation specific capabilities**
  - Jeg har selv haft indflydelse på beslutningen om at fungere som skolens X:IT koordinator (helt enig – helt uenig)
  - Jeg føler mig klædt på til rollen som X:IT koordinator (samme)
- **Decision structure**
  - Hvilke personer har været involveret i beslutningen om at deltage i projekt X:IT på skolen?

## Organisatorisk fokus – implementeringskapacitet: planlagte publikationer

- Hvordan er skolernes organisatoriske implementeringskapacitet associeret med faktisk implementering efter første års intervention?
- Implementeres interventionen forskelligt blandt elever fra forskellige socialgrupper? Efter hhv. 1 og 3 år
- Mønstre i implementering – increase vs. decrease?
- Andre? Har I gode forslag?

## Ph.d.-projekt på X:IT

- Påbegyndt 1. april 2018 og tre år frem
- Lærerne som implementeringsaktører (kvalitativt)
  - Hvordan ser de interventionen?
- De unge selv, hvordan opfatter de interventionen i forhold til deres liv? (kvalitativt + kvantitativt)
  - Ungdomskultur og rygning

# Symposium til Nordic Implementation Conference 2018

*Preparing, improving and evaluating implementation:  
Danish examples from the Centre for Intervention Research  
in health promotion and disease prevention (S1)*

- 1) a capacity analysis from an overweight and obesity preventive programme addressing infancy by using the existing structure of home health visitors across Danish municipalities.
- 2) a qualitative formative process evaluation of the implementation of a high-school based intervention to promote physical activity, sense of community and wellbeing.
- 3) a quantitative evaluation of implementation fidelity in a school-based smoking prevention trial.

# Kommentarer eller spørgsmål?