

# Introducing the CARD™ system: *Playing your best hand to improve vaccine delivery at school*



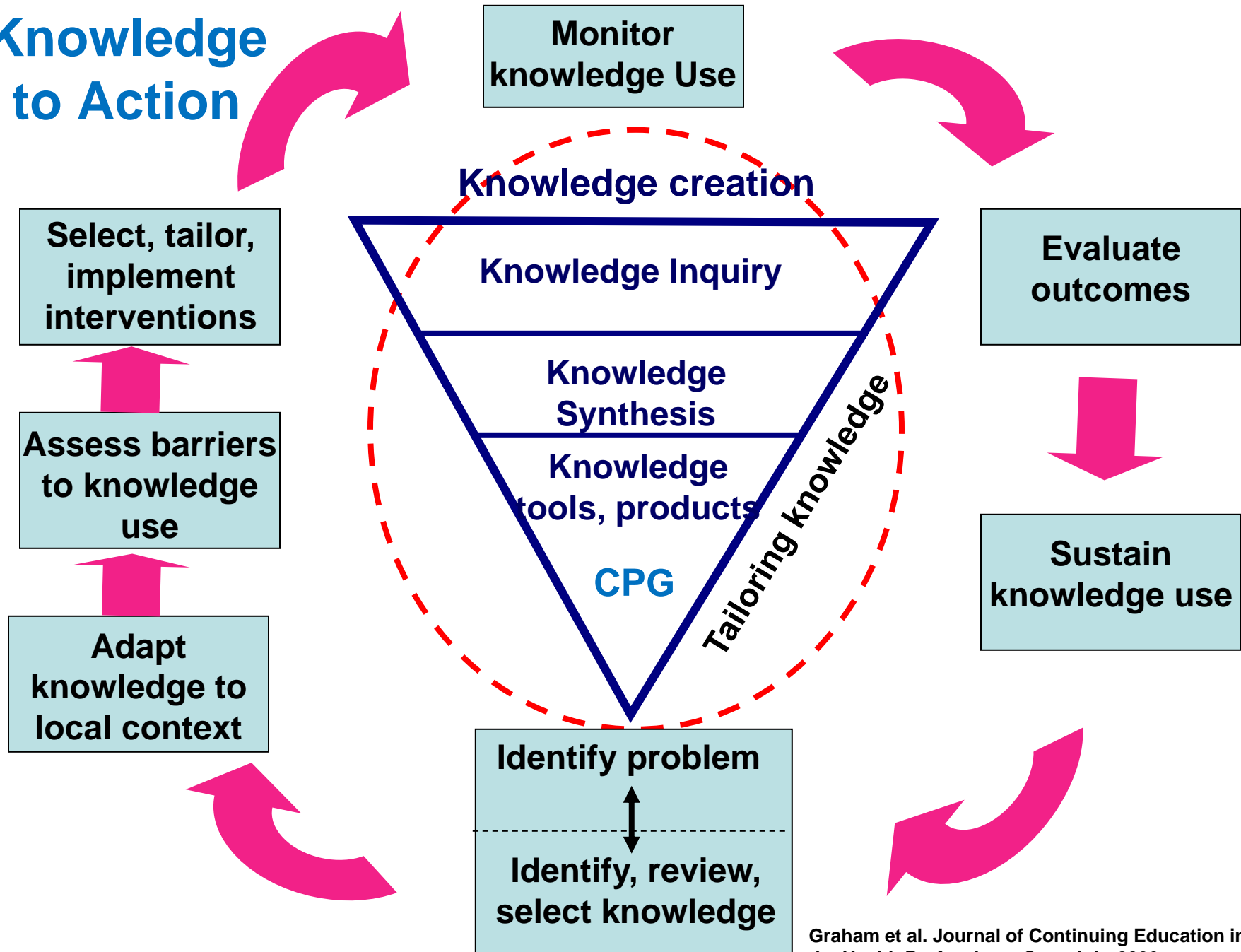
Anna Taddio PhD  
[anna.taddio@utoronto.ca](mailto:anna.taddio@utoronto.ca)

# Funding Disclosures

The work being presented was funded by:  
Canadian Institutes of Health Research (CIHR)



# Knowledge to Action



Graham et al. Journal of Continuing Education in the Health Professions. Copyright 2006

# HELPinKids&Adults: Help ELiminate Pain in Kids & Adults





Canadian Nursing Coalition

**CNCI**

for Immunization

CANADIAN  
PSYCHOLOGICAL  
ASSOCIATION



SOCIÉTÉ  
CANADIENNE  
DE PSYCHOLOGIE

THE COLLEGE OF  
FAMILY PHYSICIANS  
OF CANADA



LE COLLÈGE DES  
MÉDECINS DE FAMILLE  
DU CANADA



CANADIAN  
PHARMACISTS  
ASSOCIATION

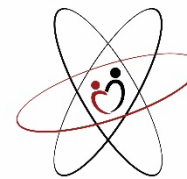
ASSOCIATION DES  
PHARMACIENS  
DU CANADA



Dalhousie University  
IWK Health Centre  
Capital Health



Anxiety  
CANADA



cfpna | acimf

Canadian Family Practice Nurses Association

Association canadienne des infirmières en médecine familiale



BC Centre for Disease Control  
AN AGENCY OF THE PROVINCIAL HEALTH SERVICES AUTHORITY



Canadian  
Paediatric  
Society



Immunize  
Immunsation Canada  
immunize.ca



the CANADIAN PAIN SOCIETY

la SOCIÉTÉ CANADIENNE de la DOULEUR

# Outline of Presentation

1. Rationale for addressing the vaccination experience at school
2. Integration of evidence-based interventions into a vaccination delivery framework (the CARD™ system)
3. Review of components of CARD™
4. Factors influencing implementation success

# Outline of Presentation

1. Rationale for addressing the vaccination experience at school
2. Integration of evidence-based interventions into a vaccination delivery framework (the CARD™ system)
3. Review of components of CARD™
4. Factors influencing implementation success

# What do vaccinations look like?





# What do vaccinations look like?



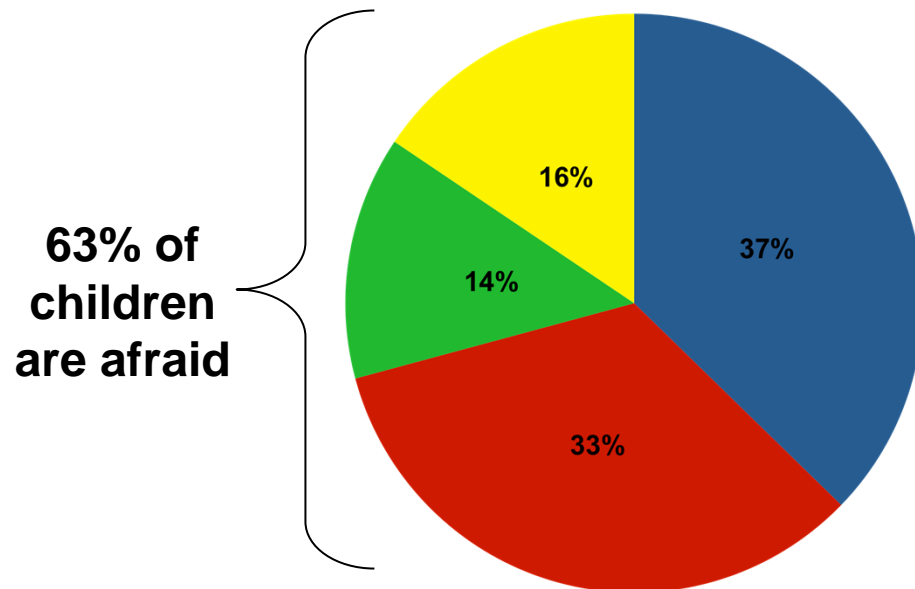
# Knowledge Creation

## **Primary research in students and school-based vaccination context**

Prevalence of fear, sub-optimal practices, negative impact on vaccination

# Prevalence of Needle Fears

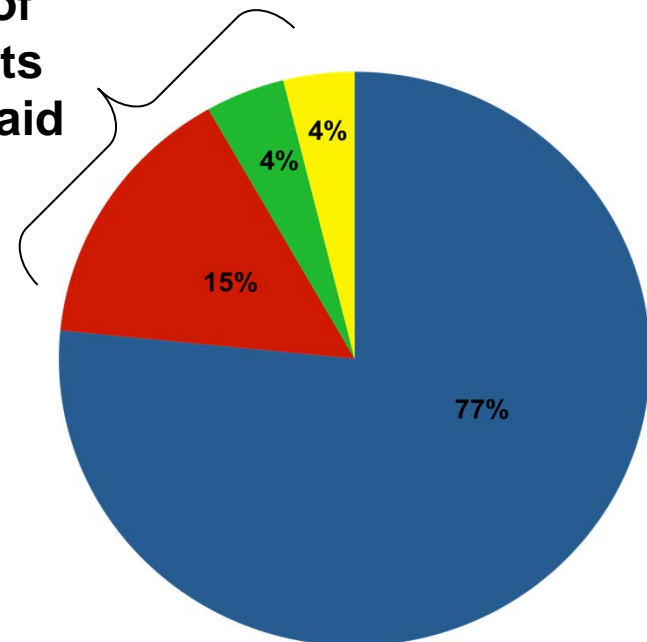
## Children



■ Not afraid    ■ A little afraid    ■ Moderately afraid    ■ Very afraid

## Parents

24% of parents are afraid

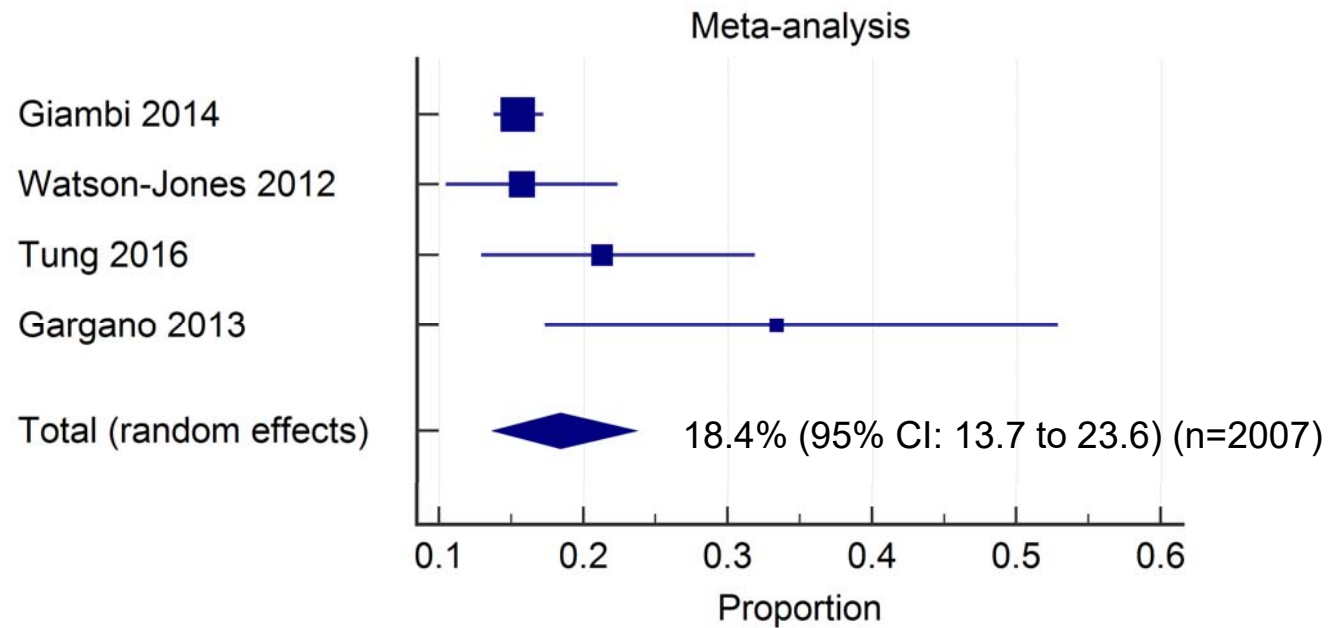


# Current Practices

- 17% of kids are given some kind of preparation about vaccination
- 50% of kids do not know strategies to cope with pain/fear
- 20% of schools have distraction items available for use

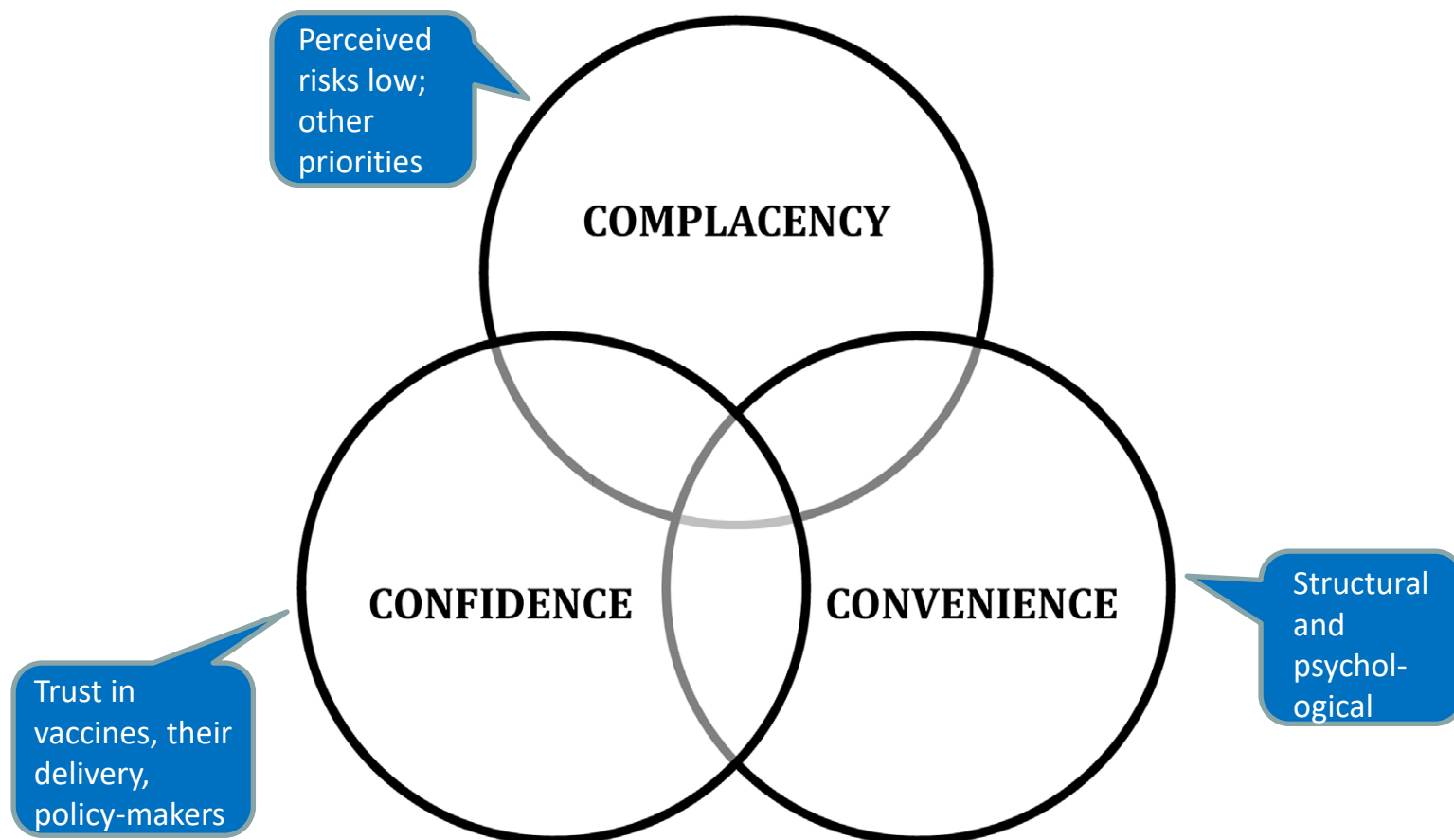
Bucci et al. Paediatr Child Health 2017;22:41-2.

# Pain/Fear as a Barrier to Vaccination for Adolescents



# WHO named Vaccine Hesitancy (VH) 1 of the 10 top threats to global health

## WHO 3C Model of VH





# Knowledge Creation

## **Clinical Practice Guideline (CPG)**

Pain, fear, fainting mitigation during  
vaccination

## Reducing pain during vaccine injections: clinical practice guideline

Anna Taddio MSc PhD, C. Meghan McMurtry PhD, Vibhuti Shah MD MSc, Rebecca Pillai Riddell PhD, Christine T. Chambers PhD, Melanie Noel PhD, Noni E. MacDonald MD, Jess Rogers BA, Lucie M. Bucci MA, Patricia Mousmanis MD, Eddy Lang MD, Scott A. Halperin MD, Susan Bowles PharmD, Christine Halpert RN MA, Moshe Ipp MD, Gordon J.G. Asmundson PhD, Michael J. Rieder MD PhD, Kate Robson, Elizabeth Uleryk MLS, Martin M. Antony PhD, Vinita Dubey MD, Anita Hanrahan RN, Donna Lockett PhD, Jeffrey Scott MD, Elizabeth Votta Bleeker PhD; HELPinKids&Adults

*CMAJ* Podcasts: author interview at [soundcloud.com/cmajpodcasts/150391-guide](https://soundcloud.com/cmajpodcasts/150391-guide)

**P**ain from vaccine injections is common, and concerns about pain contribute to vaccine hesitancy across the lifespan.<sup>1,2</sup> Non-compliance with vaccination compromises the individual and community benefits of immunization by contributing to outbreaks of vaccine-preventable diseases. Individuals may also engage in broader noncompliant behaviours if they acquire a fear of needles as a result of negative vaccination experiences.<sup>3</sup> There are many evidence-based treatments to mitigate pain at the

### Methods

#### Team composition

The HELPinKids&Adults team included 25 individuals from across Canada with expertise in pain, fear, medicine, nursing, pharmacy, psychology, vaccinology, infectious diseases, epidemiology, guideline development, knowledge translation (KT), library sciences, public health, family advisory/advocacy and health policy. Eighteen members of the HELPinKids&Adults

**Competing interests:** See end of article.

This article has been peer reviewed.

**Correspondence to:** Anna Taddio, [anna.taddio@utoronto.ca](mailto:anna.taddio@utoronto.ca)

*CMAJ* 2015. DOI:10.1503/cmaj.150391

# Evidence-based Interventions

## The 5 P's of Pain Management

- What {
1. Procedural (Procedure Techniques)
  2. Physical (Body Position & Activity)
  3. Pharmacological (Pain Medicine)
  4. Psychological (Thoughts & Behaviors)
- How {
5. Process (Education)

# Outline of Presentation

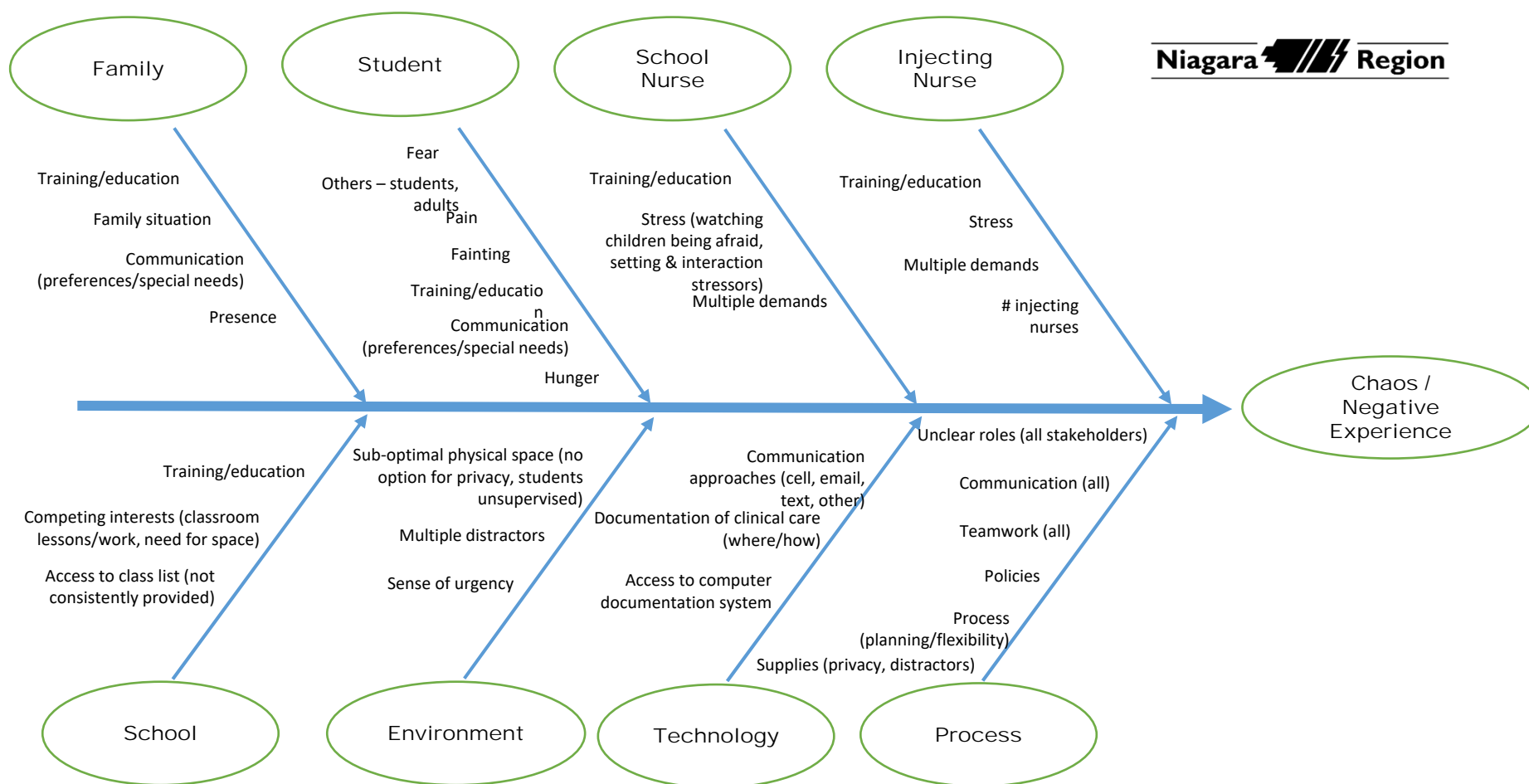
1. Rationale for addressing the vaccination experience at school
2. Integration of evidence-based interventions into a vaccination delivery framework (the CARD™ system)
3. Review of components of CARD™
4. Factors influencing implementation success

# Action Cycle (CARD™ development)

## **Identify problem**

Review processes and practices

# Niagara Region Public Health School Vaccinations



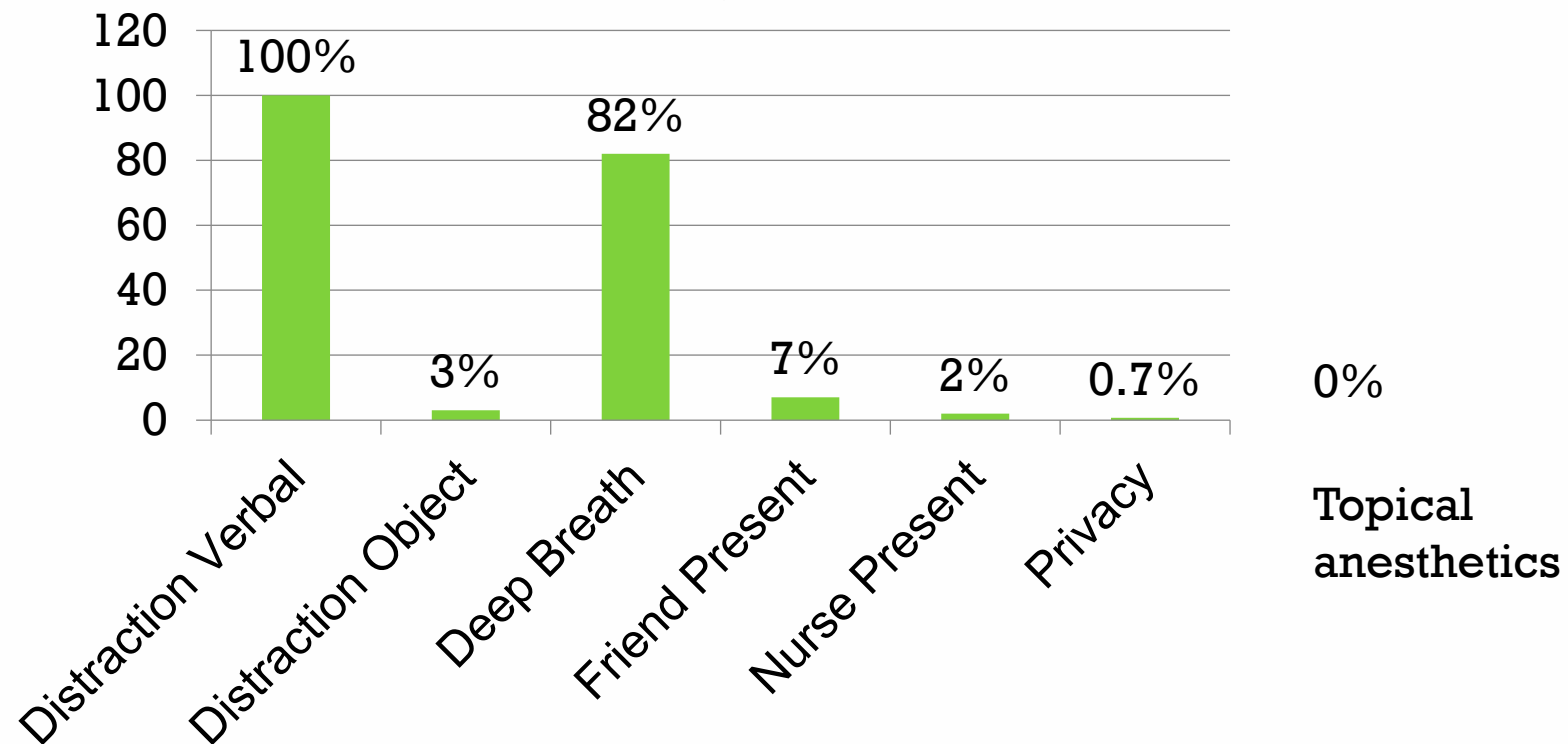
Taddio et al. Paediatr Child Health 2019; Apr (Suppl).



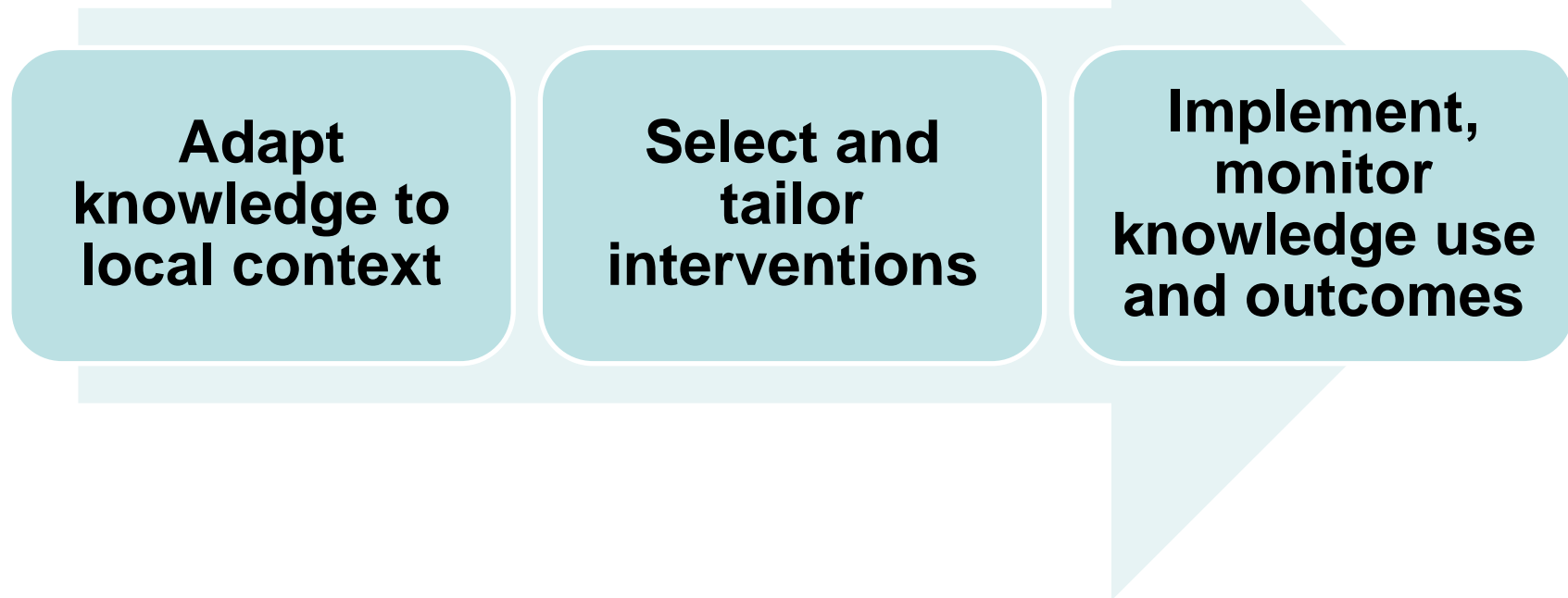
# Pain Interventions Used

(Round 3)

5 Schools, 142 Students



# Action Cycle



# The CARD™ System

## (C-Comfort, A-Ask, R-Relax, D-Distract)



**Framework that promotes patient-centred care and coping**

- Clinic planning activities
- Clinic day activities

Taddio et al. Paediatr Child Health 2019; Apr (Suppl).

# C-A-R-D is also an acronym for coping



# Playing your cards

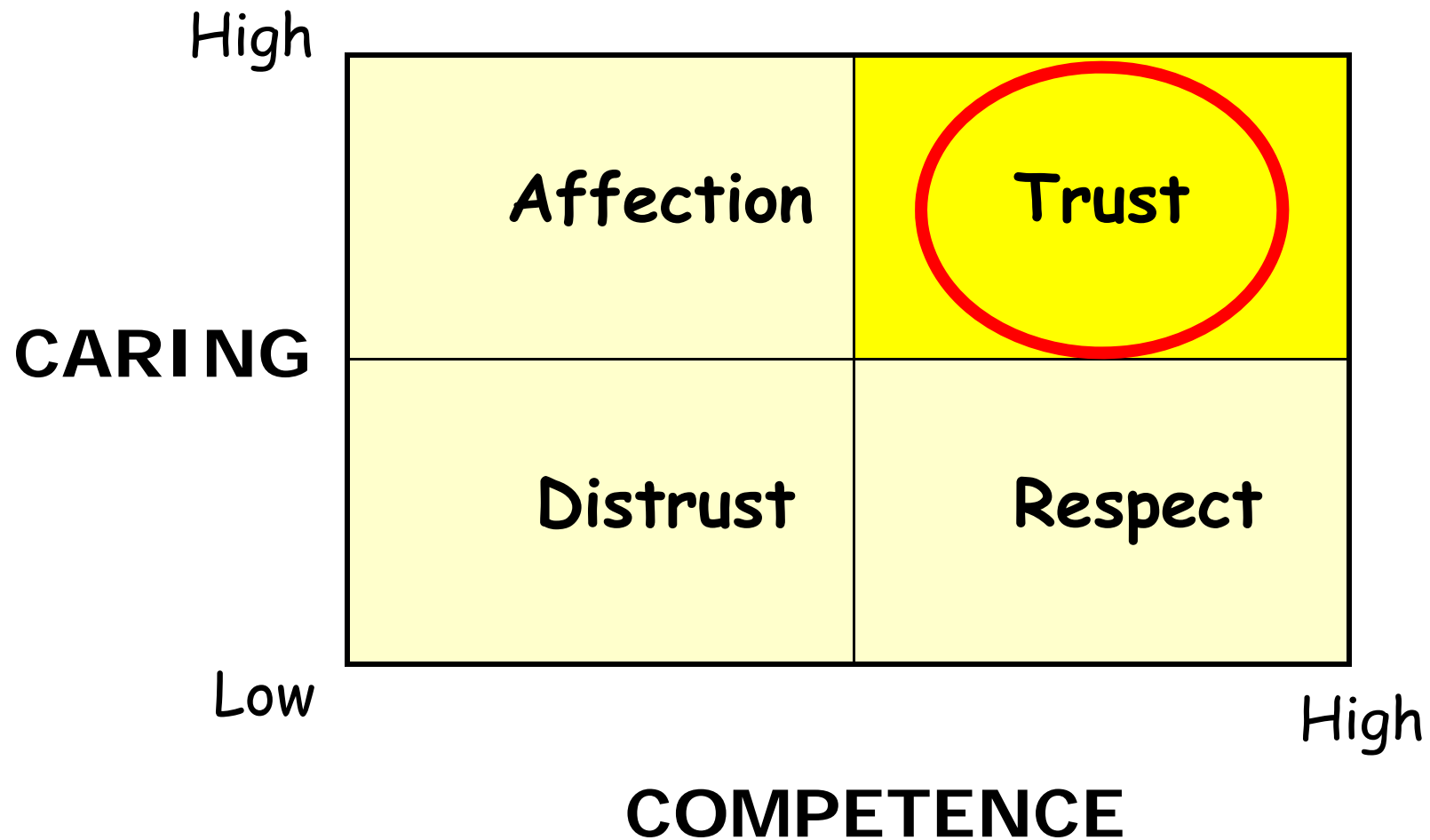


# Models of care delivery

- Person-centred care (Sharma 2015)
- Family-centred care (Power 2008)
- UNICEF Ladder of Participation (Hart 1992)
- Patient-oriented research (CIHR)
- *Involve child and family in their care; address their needs and preferences*



# Trust = *Competence + Caring*



# Outline of Presentation

1. Rationale for addressing the vaccination experience at school
2. Integration of evidence-based interventions into a vaccination delivery framework (the CARD™ system)
3. Review of components of CARD™
4. Factors influencing implementation success

# Organizational leadership involvement

- Review and preliminary adaptation of CARD™ tools and processes for local implementation
- Staff training and support, including:
  - Rationale and scientific evidence
  - Alignment with organizational values/mission (equity, quality care, client-centred)
  - Point of care tools and resources (e.g., pamphlets, videos, template scripts, template process checklists)
  - Integration with policies and work processes
- Ongoing tailoring and support of implementation

# Sample tools created

## **3 Videos:**

- Students – vaccination information  
<https://youtu.be/eFjcHVTMT8c>
- Students - coping strategies training  
<https://youtu.be/ukyAr5gcG40>
- Adults – CARD training  
<https://youtu.be/FXj6ELi4BVg>

## **3 Pamphlets:**

- Students, Parents, School staff

# Sample tools created (cont'd)

## Process Checklist

### SAMPLE TEMPLATE CHECKLIST FOR PUBLIC HEALTH FOR INTERVENTION SCHOOL CLINICS

All items below are being tracked as part of planning, executing and fidelity checks. Associated time for key activities will also be tracked using public health usual time management processes.

School: \_\_\_\_\_ Phone: \_\_\_\_\_  
Principal: \_\_\_\_\_ Fax: \_\_\_\_\_  
Contact Person: \_\_\_\_\_ School Nurse: \_\_\_\_\_

	Procedures	Rd #1	Rd #2
1.	<b>Clinic planning:</b> Contacted principal via e-mail, phone call or face-to-face to organize information for immunization clinic (late August) <input type="checkbox"/> Date confirmed for clinics: _____ <input type="checkbox"/> Date and time for immunization teaching (if not organized with teacher): _____, Date, time and person scheduled with: _____ <input type="checkbox"/> Allowing 1 period or 2 periods? _____ <input type="checkbox"/> Time of am recess: _____ Time of lunch: _____ <input type="checkbox"/> Room of clinic: _____ Space/Room to accommodate privacy (this includes a space for the student to lay down if necessary, room for 3-4 individuals and no clear (see-through) walls/windows): _____ <input type="checkbox"/> Principal agreed to have equipment available for clinic day (tables, chairs, gym mats, gym balls). <input type="checkbox"/> Space/room and how to accommodate students waiting: _____ <input type="checkbox"/> Supplies available to occupy students while waiting: _____ <input type="checkbox"/> Reviewed educational materials with principal (e.g., videos, slides, pamphlets)? <input type="checkbox"/> Distributed educational material to Principal for school staff and set up time for staff to review material (videos, other) – e.g., staff meeting, other. Date/time: _____  Principal confirmed procedures to accommodate: <input type="checkbox"/> electronic devices (If No, alternative – e.g., school ipads) <b>Yes/No</b> <input type="checkbox"/> parent support <input type="checkbox"/> peer support <input type="checkbox"/> topical anesthetics <input type="checkbox"/> food availability		

# Sample tools created (*cont'd*)

**20 key  
elements  
of CARD™**

Principal planning meeting (repeated, as relevant)
Teacher/staff education
Parent education
Student education – video 1 (information about immunization)
Student education – video 2 (information about CARD™)
Student education – CARD™ pamphlet (students self-select coping strategies for upcoming immunization)
Student education – follow-up classroom <u>visit</u> and Q&A
Reminders of vaccination day – parents
Reminders of vaccination day – students
Reminders of vaccination day – school staff
Preferred clinic space secured (e.g., library) for clinic
Private room secured for clinic for students that choose privacy as a coping strategy
Separate waiting area outside the clinic with chairs
Public health staff introductions to classes prior to clinic
Triage students for clinic (according to fear and choices, and minimize the number of students waiting)
Minimize visual cues in clinic (includes separation of tables, obscuring equipment from view)
Student symptom assessment (i.e., assessing baseline fear)
Student-led coping (i.e., CARD™)
Distraction kit present in clinic (items: fidget spinner, squishy ball, mental puzzle)
Post-clinic <u>debrief</u>



# CARD™ Framework - Key Phases and Activities

Phase of vaccination process	Activity
Preparation/planning	Ensure adequate clinic space Educate clients and immunizers about CARD Clients plan CARD coping interventions Send reminder
Vaccination day	Minimize visual cues that elicit fear Introduce immunizers and review CARD preferences Identify and triage clients with fear and special requests Use CARD during vaccination

Taddio & MacDonald. J Travel Med 2019;26(6).

# Clinic planning activities

1. Ensure adequate clinic space such as school library



# Clinic planning activities

1. Secure adequate clinic space such as school library
2. Confirm space ahead of time



# Clinic planning activities

1. Secure adequate clinic space such as school library
2. Confirm space ahead of time
3. Educate students and school staff about CARD™



# Clinic planning activities

1. Secure adequate clinic space such as school library
2. Confirm space ahead of time
3. Educate students and school staff about CARD™
4. Have students fill out CARD™ pamphlet

# Students



## THE CARD SYSTEM

These four strategies will help you with your vaccination. Use the suggestions on the back to fill in the cards. Cut them out and carry them with you so you can remind yourself wherever you are.





### WHAT DISTRACTIONS WILL YOU USE?

---

---

---

---

---

---

### WHAT WILL YOU DO TO RELAX?

---

---

---

---

---

---

### WHAT WILL YOU ASK?

---

---

---

---

---

---

### HOW WILL YOU BE COMFORTABLE?

---

---

---

---

---

---

### HOW TO DISTRACT YOURSELF

Talk to someone.  
Play video games.  
Read books.  
Play music.  
Rub your arm.  
Sing.  
Allow yourself to daydream.

### HOW TO RELAX

Do belly breathing (pretend to blow out a candle).  
Do some self-talk (tell yourself you can handle this).  
Have a friend with you.  
Have a family member or trusted adult with you.  
Have privacy.

### QUESTIONS TO ASK

What will happen on my turn?  
What vaccine am I getting?  
Can I ...

- get the vaccine in a private room?
- use numbing creams or patches?
- bring my friend?
- bring a family member?
- bring a trusted adult?
- look at the needle?

### HOW TO GET COMFORTABLE

Wear short sleeves, or something that lets you show *your upper arm easily for the needle*.  
Eat a snack.  
Bring a favourite item.  
Sit up in a chair.  
Make your arm loose or jiggle (like cooked spaghetti).  
Tense your stomach and leg muscles if you get dizzy.

# Sample completed CARD™ pamphlet

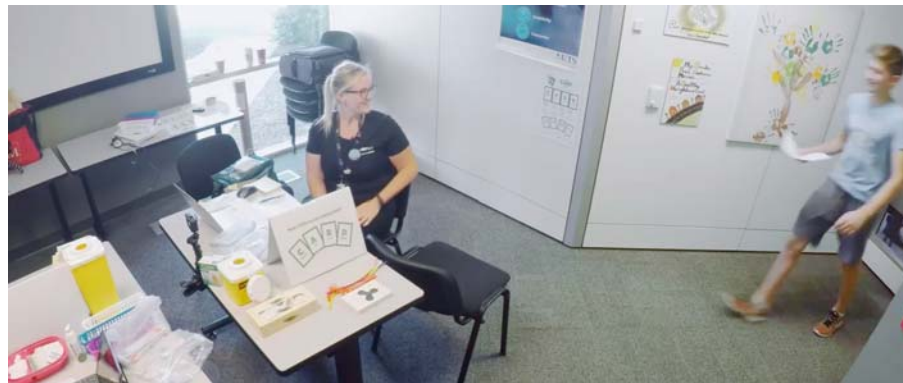
✂ Cut here.

<p><b>WHAT DISTRACTIONS WILL YOU USE?</b></p> <p>Talk to my friend</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>	<p><b>WHAT WILL YOU DO TO RELAX?</b></p> <p>Have my friend with me</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>	<p><b>WHAT WILL YOU ASK?</b></p> <p>Can I bring my friend?</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>	<p><b>HOW WILL YOU BE COMFORTABLE?</b></p> <p>eat a snack</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>
<p><b>HOW TO DISTRACT YOURSELF</b></p> <p>Talk to someone.</p> <p>Play video games.</p> <p>Read books.</p> <p>Play music.</p> <p>Rub your arm.</p> <p>Sing.</p> <p>Allow yourself to daydream.</p>	<p><b>HOW TO RELAX</b></p> <p>Do belly breathing (pretend to blow out a candle).</p> <p>Do some self-talk (tell yourself you can handle this).</p> <p>Have a friend with you.</p> <p>Have a family member or trusted adult with you.</p> <p>Have privacy.</p>	<p><b>QUESTIONS TO ASK</b></p> <p>What will happen on my turn?</p> <p>What vaccine am I getting?</p> <p>Can I ...</p> <ul style="list-style-type: none"> <li>• get the vaccine in a private room?</li> <li>• use numbing creams or patches?</li> <li>• bring my friend?</li> <li>• bring a family member?</li> <li>• bring a trusted adult?</li> <li>• look at the needle?</li> </ul>	<p><b>HOW TO GET COMFORTABLE</b></p> <p>Wear short sleeves, or something that lets you show your upper arm easily for the needle.</p> <p>Eat a snack.</p> <p>Bring a favourite item.</p> <p>Sit up in a chair.</p> <p>Make your arm loose or jiggle (like cooked spaghetti).</p> <p>Tense your stomach and leg muscles if you get dizzy.</p>



# Clinic day activities

## 1. Minimize visual cues that elicit fear



## Table Poster and Distraction kit



# Clinic day activities

1. Minimize visual cues that elicit fear
2. Visit classroom before clinic starts



# Clinic day activities

1. Minimize visual cues that elicit fear
2. Visit classroom before clinic starts
3. Identify and triage students with fear and special requests



# Clinic day activities

1. Minimize visual cues that elicit fear
2. Visit classroom before clinic starts
3. Identify and triage students with fear and special requests
4. Use CARD™ (assess level of fear and honor coping preferences)

# Video 1 – CARD™





## Video 2 – CARD™



# Implementation Project

Design: Controlled clinical trial

Setting: Niagara Region Public Health

Intervention: CARD™ in 5 schools and standard care in 5 schools for Round 1 & 2 vaccine clinics in grade 7 students (2017-18)

Outcomes: Student symptoms (fear, pain, dizziness), attitudes and satisfaction

Freedman et al. Paediatr Child Health 2019; April (Suppl).



# Effect of CARD™ on Symptoms

CARD™ vs. Standard Care

## Round 1:

↓ Fear: 19% vs. 31%  
↓ Dizziness: 3% vs. 10%  
= Pain: 11% vs. 9%

## Round 2:

↓ Fear: 15% vs. 30%  
↓ Dizziness: 1% vs. 5%  
= Pain: 10% vs. 10%

P<0.05 for fear  
and dizziness

Freedman et al. Paediatr Child Health 2019; Apr (Suppl).

# Focus Group Feedback

All key stakeholder groups

- students, school staff, nurses, parents

- ↑ Attitudes about CARD™

- ↑ Satisfaction with school vaccinations

# Stakeholder feedback about CARD™

Together  
Everyone  
Achieves  
More

“Its just building on the skills we already have”

“Everything was just a little more strategic”

“Students were prepared, confident, empowered”

“We were able to make it an enjoyable experience”

“The fear question showed that you cared, right to the very end and you got feedback after the experience. ”

“I love my job and this made it better”

“It made a big difference. I don’t know why you would go back.”

Taddio et al. Paediatr Child Health 2019; Apr (Suppl).

# Outline of Presentation

1. Rationale for addressing the vaccination experience at school
2. Integration of evidence-based interventions into a vaccination delivery framework (the CARD™ system)
3. Review of components of CARD™
4. Factors influencing implementation success

# Key factors for successful implementation

- Culture of organization – quality improvement
- Formally appointed implementation leaders
- Ongoing communication and collaboration
- Involvement of staff to provide feedback for refinement of implementation
- Partnerships with external organizations and individuals – school staff and kids
- Acceptability, appropriateness, adaptability, compatibility, and feasibility of intervention
- Documentation of effectiveness and satisfaction

# Key challenges to address during implementation

- Role of leadership and on-site implementation lead/champion to support staff and problem-solve
- Availability of resources for staff (time, 'how to' operationalize components of CARD™, competency building)
- Staff buy-in, stage of change
- Start small, refinement and scale up
- Relationship building with external stakeholders, including school staff; nurse comfort and practice

# Adaptations of CARD™...

- Different regions (e.g., implementation context)
- Different populations (e.g., adults)
- Different clinical settings (e.g., dentistry)
- Different indications (e.g., anxiety)

# What CARD™ are you playing today?

