

# VIRTUAL REALITY WORKSHOP

**APRIL 26, 2024**



9:00AM – 3:00PM



Shriners Hospitals for Children-Canada  
1003 Blvd Décarie, Montréal, Canada

Learn the ins and outs of using VR in child health settings.

Join us for our in-person, one-day VR workshop, where you will:

- learn about the evidence for VR in pain/anxiety management
- meet with VR companies and try out their products
- create a mobilization/implementation plan for VR integration.

Register using the link below:

[mcgill.ca/VirtualRealityforChildCare/vr-workshop-registration](https://mcgill.ca/VirtualRealityforChildCare/vr-workshop-registration)



McGill.CA / VIRTUAL REALITY FOR CHILD CARE / About Us

Who We Are

**What We Are Doing**

## What We Are Doing

We are building a virtual hub to disseminate resources, the latest research-based findings, and current events related to the use of virtual reality in child healthcare. Our goal is to build a community and connect individuals, organizations, and institutions that share the common interest of improving pediatric healthcare practice using the latest innovative technology.

## Research Study

We are conducting an infrastructure research study at the Ingram School of Nursing, funded by the Réseau de santé bucco-dentaire et osseuse. The study uses a hybrid approach for data collection and seeks to:

1. Understand the knowledge gaps regarding VR use in child healthcare;
2. Deliver a workshop to train decision makers and healthcare professionals to be VR champions;
3. Co-develop knowledge mobilization resources to facilitate VR implementation.

We are looking for decision-makers and healthcare professionals working in children healthcare settings to tell us about their knowledge needs and to participate in a workshop to learn about VR use. For more information, [complete this questionnaire](#) or scan the QR code below:





# LAND ACKNOWLEDGEMENT



McGill University is on land which has long served as a site of meeting and exchange amongst Indigenous peoples, including the Haudenosaunee and Anishinabeg nations. We acknowledge and thank the diverse Indigenous peoples whose presence marks this territory on which peoples of the world now gather.

# INDIGENOUS VIRTUAL REALITY

To learn more how we may use virtual reality to learn of the history and present contexts of Indigenous Peoples in Canada, including efforts to revitalize and preserve Indigenous languages, introduce new teaching tools in the schools, and understand the diverse indigenous experiences, we invite you to follow the links below as a starting point:

- <https://immersivelink.ca/>
- <https://barrie.ctvnews.ca/video/c2894240-indigenous-learning-virtual-reality-program>
- <https://www.georgiancollege.ca/blog/newsroom/new-georgian-partnerships-take-indigenous-language-vr-program-across-canada/>
- Wallis, K., & Ross, M. (2021). Fourth VR: Indigenous virtual reality practice. *Convergence*, 27(2), 313-329.

<https://journals.sagepub.com/doi/10.1177/1354856520943083>





<https://immersivelink.ca/>

## Connection is Our Priority

ImmersiveLink VR technology delivers career training and Indigenous knowledge experiences to communities across Canada.



Powered by  **ORIGIN**  
LET'S WORK. TOGETHER.

- > Our proprietary product ImmersiveLink is an industry-leading platform in career and cultural exploration.
- > Our technology can be used to rekindle the bond between Indigenous youth and adults with traditional culture, while providing all peoples with a greater understanding of diverse Indigenous experiences.

[Book a Discovery Call](#) +



# New Georgian partnerships take Indigenous language VR program across Canada

Jan. 9, 2024

Students in Ontario and Saskatchewan will soon explore Indigenous language and cultures using virtual reality (VR) as part of their school curriculums thanks to new Georgian College partnerships involving its immersive learning technology.

The [Simcoe County District School Board \(SCDSB\)](#) and the [Saskatchewan Indian Institute of Technologies](#) are the first to sign memorandums of alliance with Georgian to allow their elementary, secondary and postsecondary students, respectively, access to the college's VR worlds that explore Indigenous language in the home, community, workplace, natural environment and more.



Left to right: Simcoe County District School Board Ojibwe language teachers Brent Roy, Laurie Smith and Jake King received virtual-reality training from Rob Theriault, Immersive Technology Manager at Georgian College.







# The Barriers, Facilitators and Contextual Challenges of VR Use

**Argerie Tsimicalis, RN PhD**

Nurse Scientist, Shriners Hospitals for Children®-Canada  
Associate Professor, Ingram School of Nursing, McGill University  
Junior 2 Scholar – Fonds de recherche Québec-Santé

*Illustration by Stephanie Smith, BFA*



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**Shriners Hospitals**  
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**Canada**



**McGill**  
UNIVERSITY

**Fonds de recherche**  
**Santé**

**Québec**



RÉSEAU DE RECHERCHE EN SANTÉ  
BUCCODENTAIRE ET OSSEUSE



**I HAVE NO CONFLICTS OF  
INTEREST TO DECLARE.**



# CONTEXT

Virtual Reality (VR) Research and Implementation Lag



## Evidence for VR

- Hoffman et al. (2000) introduced VR to relieve children from painful burn wound care procedures.<sup>1</sup>



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## SnowWorld melts away pain for burn patients, using virtual reality snowballs (GeekWire by Timothy Kenney, 2018)



A burn patient uses SnowWorld during a wound cleaning. The wide-view goggles, audio headphone, and simple hand controller help keep the patient from focusing on their pain. (Photo courtesy of Hunter Hoffman)



The cool blues and icy tundra of SnowWorld help reduce the pain a burn patient experiences by up to 50 percent. Patients can throw virtual snowballs at the penguins or just go along for the ride. (Photo courtesy of Hunter Hoffman)



# CONTEXT

Virtual Reality (VR) Research and Implementation Lag



## Evidence for VR

- Many studies have been published, establishing VR effectiveness to reduce procedural pain and anxiety in children.<sup>2</sup>

### ■ META-ANALYSIS

## ■ Systematic Review and Meta-analysis of Virtual Reality in Pediatrics: Effects on Pain and Anxiety

Robin Eijlers, MSc,\* Elisabeth M. W. J. Utens, PhD,\*†‡ Lonneke M. Staals, MD, PhD,§ Pieter F. A. de Nijs, MD, PhD,\* Johan M. Berghmans, MD,\*|| René M. H. Wijnen, MD, PhD,¶ Manon H. J. Hillegers, MD, PhD,\* Bram Dierckx, MD, PhD,\* and Jeroen S. Legerstee, PhD\*

**BACKGROUND:** Medical procedures often evoke pain and anxiety in pediatric patients. Virtual reality (VR) is a relatively new intervention that can be used to provide distraction during, or to prepare patients for, medical procedures. This meta-analysis is the first to collate evidence on the effectiveness of VR on reducing pain and anxiety in pediatric patients undergoing medical procedures.

**METHODS:** On April 25, 2018, we searched EMBASE, MEDLINE, CENTRAL, PubMed, Web of Science, and PsycINFO with the keywords “VR,” “children,” and “adolescents.” Studies that applied VR in a somatic setting with participants ≤21 years of age were included. VR was defined as a fully immersive 3-dimensional environment displayed in surround stereoscopic vision on a head-mounted display (HMD). We evaluated pain and anxiety outcomes during medical procedures in VR and standard care conditions.

**RESULTS:** We identified 2889 citations, of which 17 met our inclusion criteria. VR was applied as distraction (n = 16) during venous access, dental, burn, or oncological care or as exposure (n = 1) before elective surgery under general anesthesia. The effect of VR was mostly studied in patients receiving burn care (n = 6). The overall weighted standardized mean difference (SMD) for VR was 1.30 (95% CI, 0.68–1.91) on patient-reported pain (based on 14 studies) and 1.32 (95% CI, 0.21–2.44) on patient-reported anxiety (based on 7 studies). The effect of VR on pediatric pain was also significant when observed by caregivers (SMD = 2.08; 95% CI, 0.55–3.61) or professionals (SMD = 3.02; 95% CI, 0.79–2.25). For anxiety, limited observer data were available.

**CONCLUSIONS:** VR research in pediatrics has mainly focused on distraction. Large effect sizes indicate that VR is an effective distraction intervention to reduce pain and anxiety in pediatric patients undergoing a wide variety of medical procedures. However, further research on the effect of VR exposure as a preparation tool for medical procedures is needed because of the paucity of research into this field. (Anesth Analg 2019;129:1344–53)

### KEY POINTS

- **Question:** Is virtual reality (VR) effective in reducing pain and anxiety in pediatric patients undergoing medical procedures?
- **Findings:** VR was most often used as a distraction method during medical procedures and was found to be significantly more effective in reducing pain (14 studies) and anxiety (7 studies), with large effect sizes, than care as usual (CAU).
- **Meaning:** VR can be used effectively as a distraction method in clinical practice, but more research is needed to establish evidence on VR exposure as a preparation tool for medical procedures.



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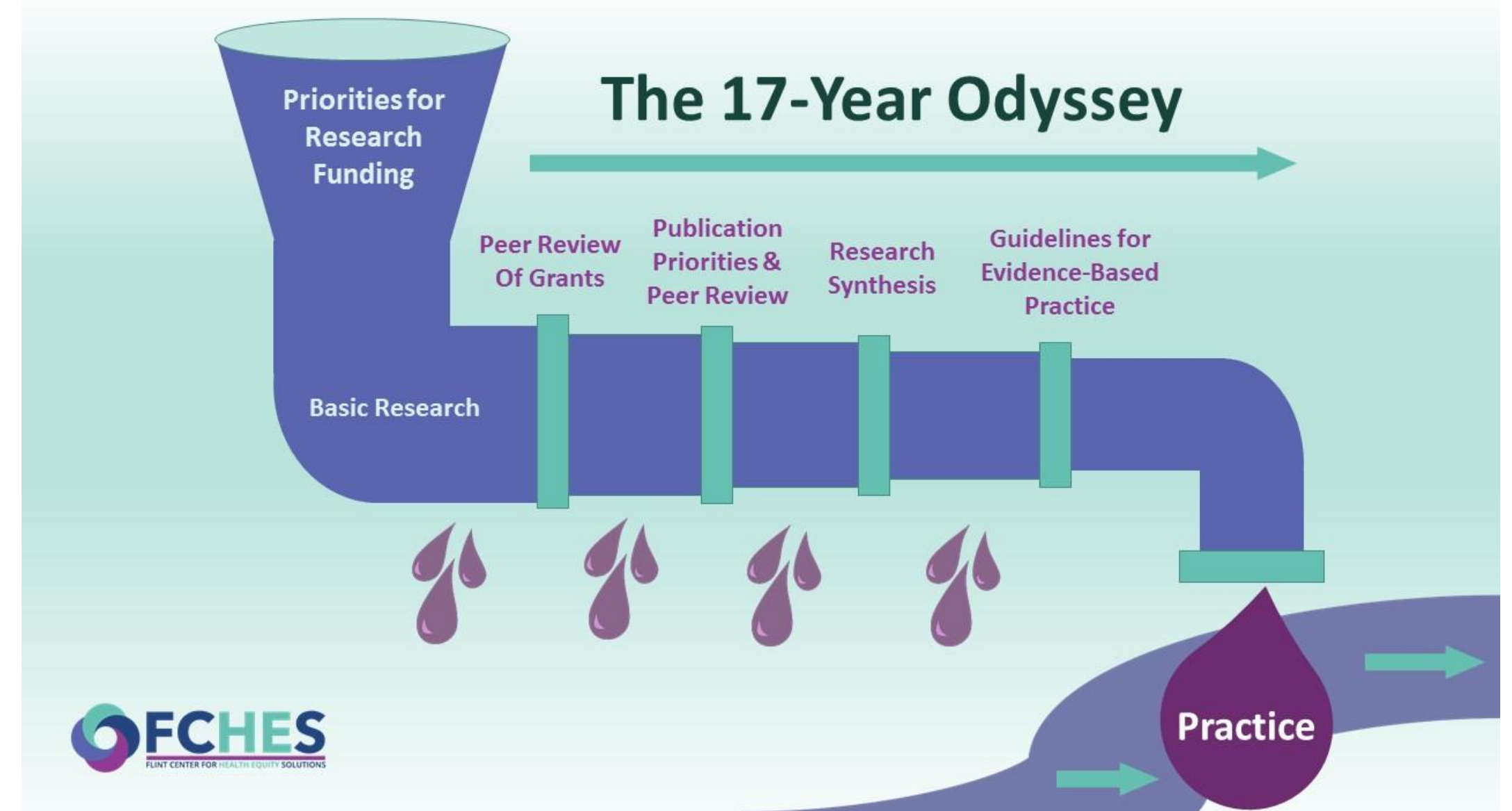
# CONTEXT

Virtual Reality (VR) Research and Implementation Lag



## Implementation Lag

- Despite the accumulated evidence, VR lags in its integration into clinical practices.
- Consequence: children continue to experience unnecessary procedural pain and anxiety.<sup>3,4</sup>



**Procedural pain management in children & youth:  
A toolkit for health professionals**

[kidsinpain.ca/skip-resources](https://kidsinpain.ca/skip-resources)

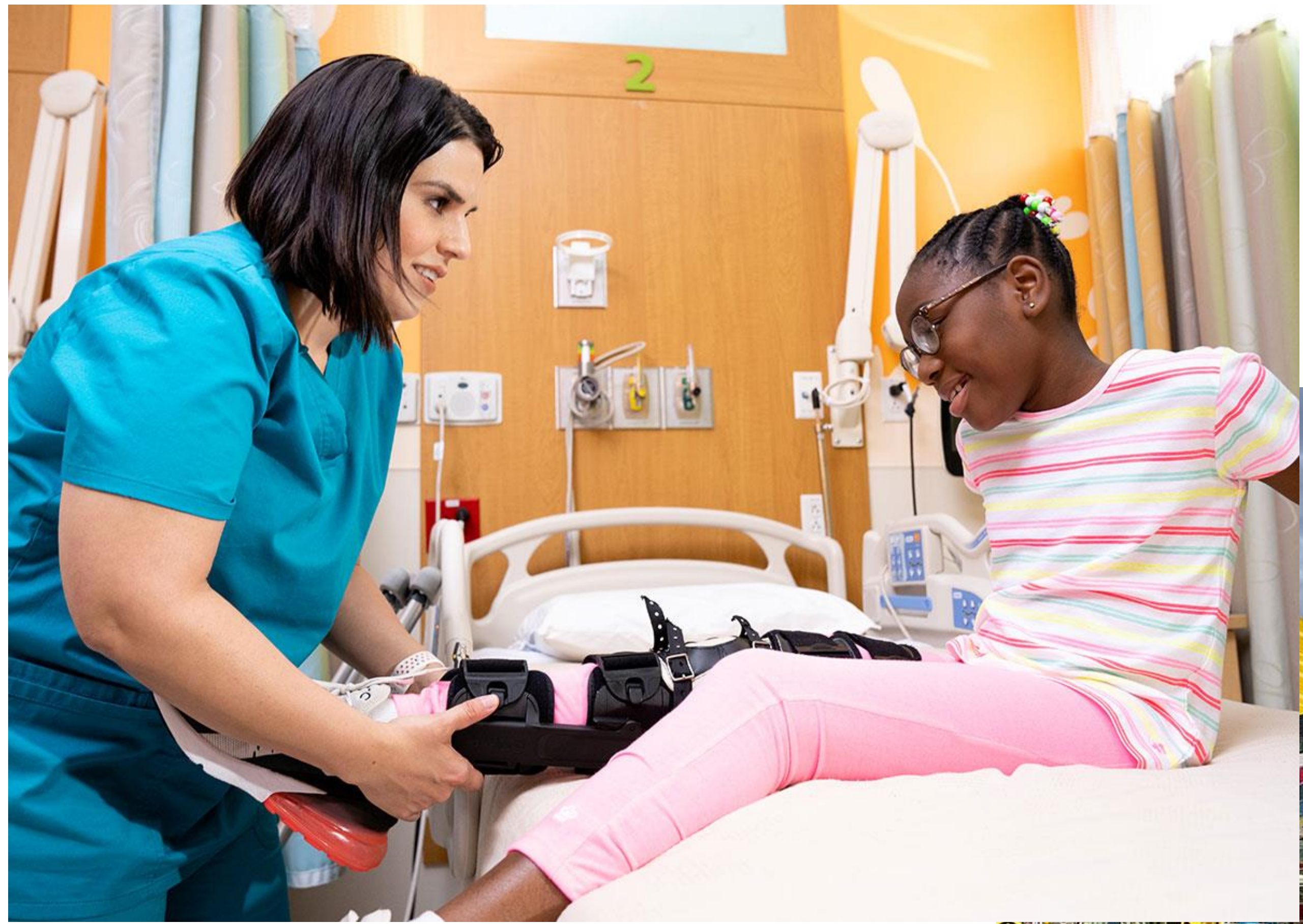
skip solutions for kids in pain pour la douleur chez les enfants

Children's Healthcare Canada Santé des enfants Canada



# READINESS FOR VR ADOPTION

2017-present





# OVERVIEW OF VR EFFORTS AT SHRINERS



REVIEW

## Use of virtual reality in managing paediatric procedural pain and anxiety: An integrative literature review

Sofia Addab BSc MSc, Reggie Hamdy MB MSc FRCSC, Kelly Thorstad MSc(A)N PHCNP, Sylvie Le May RN PhD, Argerie Tsimicalis RN PhD

First published: 2017 | ORIGINAL ARTICLE



Funding inform: Tunis Shriners H

## The use of virtual reality during medical procedures in a pediatric orthopedic setting: A mixed-methods pilot feasibility study

Sofia Addab<sup>1,2</sup> | Reggie Hamdy<sup>1,2</sup> | Sylvie Le May<sup>3,4</sup> | Kelly Thorstad<sup>2</sup> | Argerie Tsimicalis<sup>1,2</sup>



Illustration by Yu Tong Huang, 4<sup>th</sup> year medical student



## 2017-2018 Stakeholder Engagement and Consultation

- Sought interest and buy-in from hospital staff



## 2019-2020 VR Research Studies

- Integrative literature review to synthesize evidence for VR use in pediatric patients.
- Pilot Feasibility Study: outpatient, inpatient



## 2020-2021 Pins RCT (PI Le May)



Recruitment site: VR vs iPad distraction during pin/suture removals.

## 2021-2023 Pilot Feasibility Study: Peri-Operative Setting



Is VR feasible, clinically useful, and tolerable in the peri-operative setting?



# OVERVIEW OF OUR VR EFFORTS



CLS and nurses using VR in the treatment center.  
Consent was obtained for photographs.



## May 2022 – May 2023 Pilot Quality Improvement Project



We partnered with industry leaders to implement the use of VR at our hospital using governmental funds.



## 2022-Present Major Structure Grant



Understanding the barriers, facilitators, contextual challenges of using VR in clinical practice; hosting a workshop to train healthcare professionals; and co-developing knowledge mobilization tools to bridge usage gaps.



# VR Council

Our team leading VR efforts at SHC-Canada.



Dr. Reggie Hamdy,  
FRCSC  
Medical Executive



Kelly Thorstad, MSc(A)N,  
PHCNP  
Nurse Executive



Argerie Tsimicalis,  
RN PhD  
Nursing Research Lead



Alexandra de Almeida,  
RN MScN  
Clinical Lead



Tina Athanasoulis,  
RN MScN  
Clinical Lead



Katerina Bogdanov, RN  
IT/SHCIS Lead



Angie Gugliotti, CLS  
VR Champion



Sofia Addab, MSc  
Research Consultant



Family Centered  
Care Partnership  
Patient/Parent  
Representatives



# Family Centered Care Partnership

Patient/Parent Representatives

Téléjournal Montréal  
Hôpital Shriners : la réalité virtuelle pour atténuer les craintes



**HÔPITAUX SHRINERS**  
**ALAB AGUILA**

01:17 / 02:27  
Avec la réalité virtuelle, c'est tellement plus facile d'oublier la douleur et surtout l'anxiété.

**Hôpital Shriners : la réalité virtuelle pour atténuer les craintes**

Téléjournal Montréal  
Hôpital Shriners : la réalité virtuelle pour atténuer les craintes



**HÔPITAUX SHRINERS**  
**JOANNE AGUILA**

01:26 / 02:27  
Le fait de savoir à l'avance qu'il va se sentir mieux durant l'intervention et être plus calme,

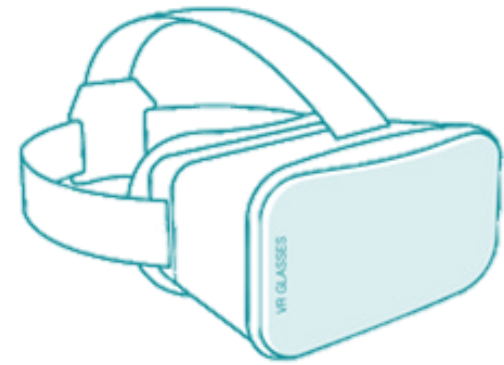
**Hôpital Shriners : la réalité virtuelle pour atténuer les craintes**





# VR INFRASTRUCTURE

Creation of a Network of Local Experts, Champions and Trainees



## 2022-Present Major Structure Grant

Understanding the barriers, facilitators, contextual challenges of using VR in clinical practice; hosting a workshop to train healthcare professionals; and co-developing knowledge mobilization tools to bridge usage gaps.



Juliana Marulanda  
DDS, PhD  
Postdoctoral Fellow



Mitchel Bernstein  
MD, FRSC (C)  
Orthopedic Surgeon



Panagiotis Glavas,  
MD, FRSC (C)  
Orthopedic Surgeon



Thierry Benaroch MD,  
MSC, FRSC (C)  
Orthopedic Surgeon/  
Chief of Sta





Sylvie Le May, RN,  
PhD  
Nurse Scientist



Raissa Passos dos  
Santos, RN, PhD  
Postdoctoral Fellow



Gianluca Bertolizio,  
MD, FRCP (C)  
Pediatric Anesthetist



Jenny Wang, RN,  
MA, PhD Student  
Nursing



Beatriz Ferraz dos  
Santos, DDS, MSc  
Pediatric Dentistry



Brandon Benchimol-  
Elkaim, MA, PhD  
Student  
Counselling Psychology



Camille Costa, MD,  
MSc, FRCP (C)  
Pediatrician: Physical  
Medicine and  
Rehabilitation



Dilek Sayik, RN,  
PhD  
Postdoctoral Fellow





Peter Joseph  
Mounsef  
MDCM Candidate



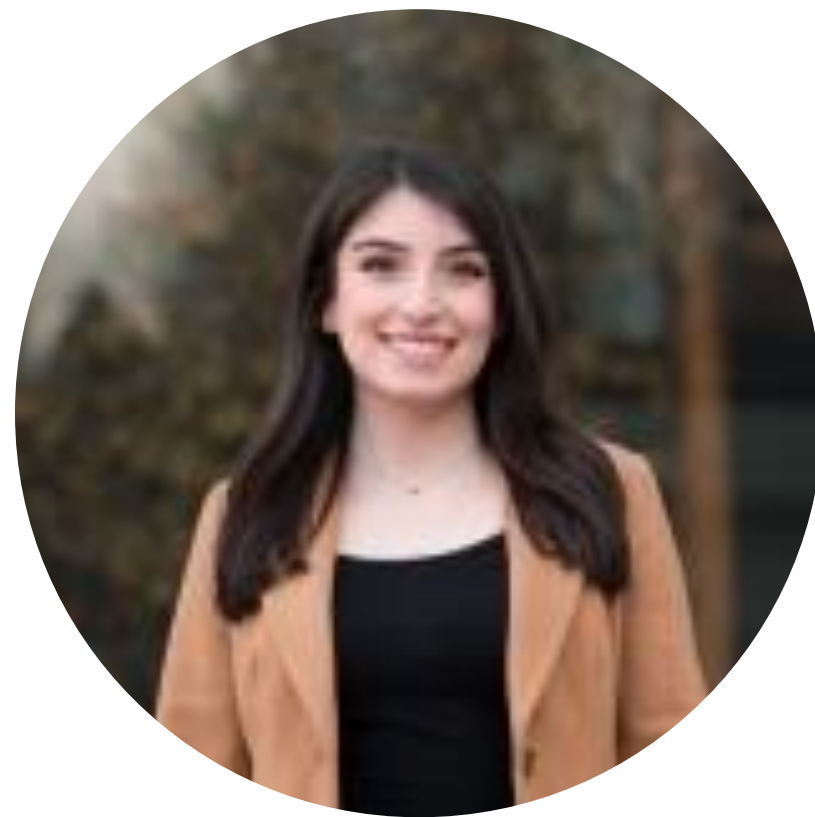
Yu Tong Huang  
MDCM Candidate



Alisha Michalovic  
RN, MSc(A)  
Faculty Lecturer



Jessica Ding RN,  
BNI  
Graduate Student



Sarah Moussa  
MDCM Candidate



# PRESS LAUNCH

Pilot project culminated in a press launch, fostering future collaborations.



MONTREAL

Virtual reality tech to help pediatric patients manage pain at Montreal hospital



HÔPITAL SHRINNERS : LA RÉALITÉ VIRTUELLE POUR ATTÉNUER LES CRAINTES



L'hôpital Shriners pour enfants fait appel à la technologie pour aider ses patients à traverser des épreuves. Les soignants utilisent la réalité virtuelle pour distraire les enfants et ça marche! Reportage de Normand Grondin.



WEEKDAYS 5:30AM

CBC ONE 88.5 FM #CBCLISTEN



LEDEVOIR

L'actualité



Hôpitaux Shriners pour enfants  
Shriners Hospitals for Children

Canada









- Overview
- Inspire
- Imagine
- Dream
- Dream Eye
- Logout

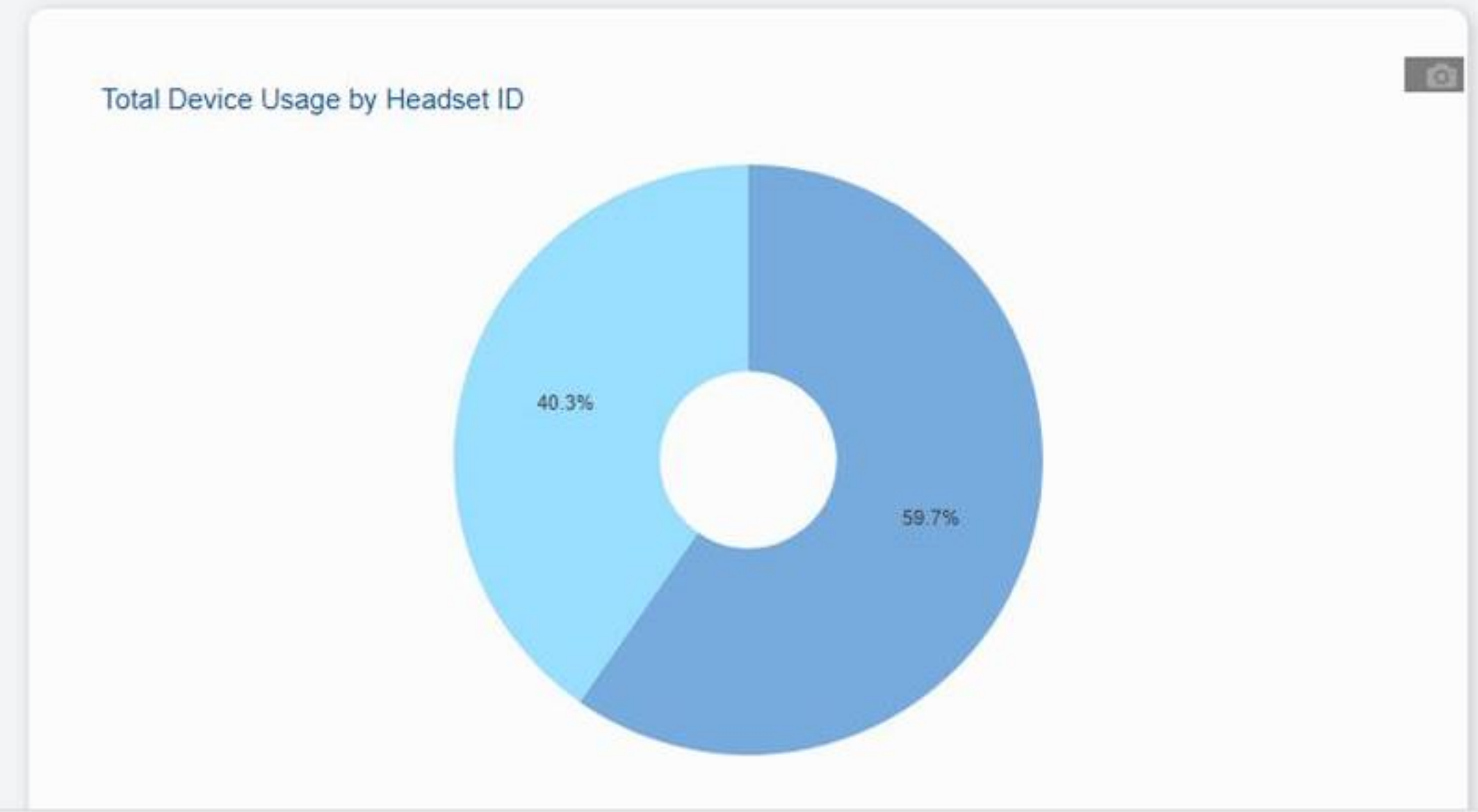
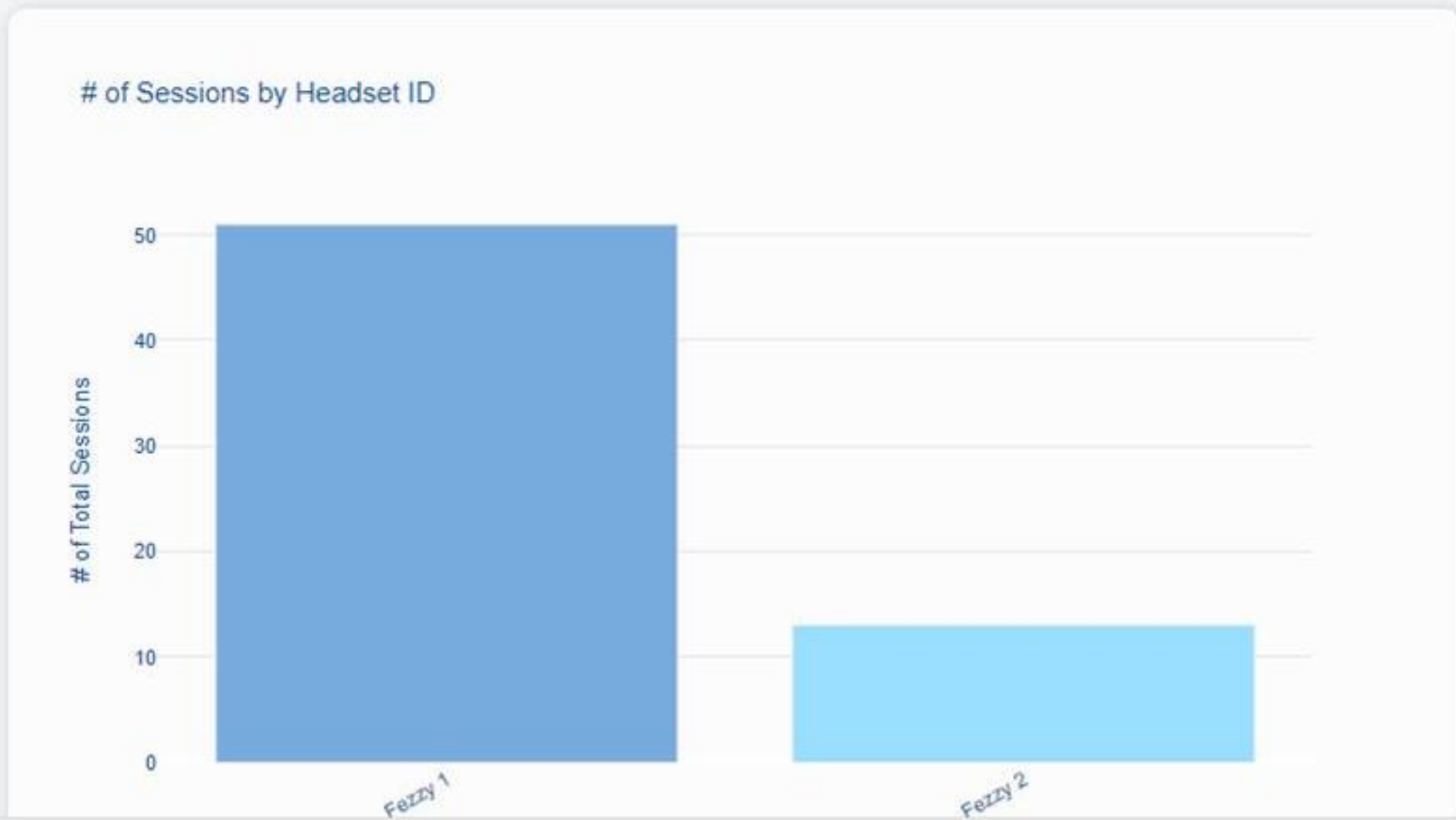
## Headset Usage Overview

Headset #1  
**Fezzy 1**

Headset #2  
**Fezzy 2**

# of Sessions Recorded by Fleet  
**64**

Avg Session Duration  
**10.25 min**





# VIRTUAL REALITY FOR CHILD CARE KNOWLEDGE MOBILIZATION HUB

Assessing Barriers, Facilitators, and Contextual Challenges for Use of Virtual Reality  
Offering Collaborative Solutions and Resources for Implementation



Fr

McGill | Virtual Reality for Child Care

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Home About Us Publications Resources News Events

**Welcome to the McGill Virtual Reality for Child Care Hub!**

This is a virtual hub founded to disseminate resources, the latest research-based findings, and current events related to virtual reality in the child healthcare field. Our goal is to build a community and connect individuals, organizations, and institutions that share the common interest of improving pediatric healthcare practice using the latest innovative technology.



# OBJECTIVES



*Physician, nurse, and CLS using VR during Botulinum toxin injections.  
Consent was obtained for photographs.*

## ASSESS READINESS

To assess the barriers, facilitators, and contextual challenges currently experienced in the use of VR in a healthcare setting.

## TRAINING

To train healthcare professionals and trainees across Québec on the use of VR for procedural pain and anxiety management.

## DEVELOPING RESOURCES

To develop resources to disseminate research evidence for VR and facilitate safe VR integration in healthcare settings.



# METHODS

- We are conducting an organizational participatory research design guided by the Knowledge-to-Action Framework.

## ASSESS READINESS

Online, ADOPT-VR2 survey to healthcare professionals across Québec to assess determinants of prospective take-up of VR.



## DEVELOPING RESOURCES

Based on survey and workshop, we will co-develop KM resources to support VR dissemination and use. Resources are published on the VRCC website.

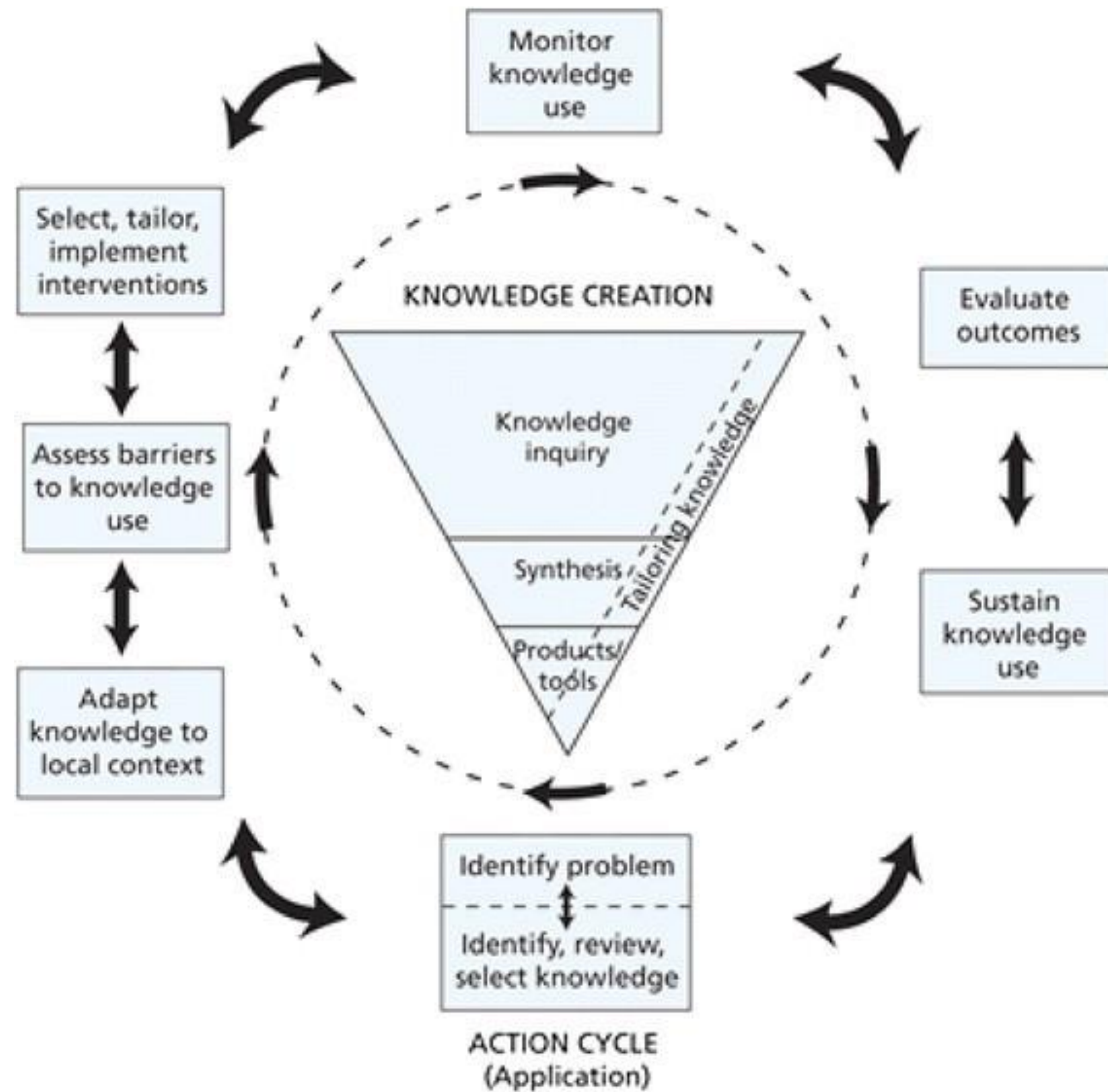


## TRAINING

Based on survey feedback, we will host a workshop to train healthcare professionals in VR use, targeting specific barriers and contextual challenges.







**The Knowledge to Action Framework.** From Graham I, Logan J, Harrison M, Strauss S, Tetroe J, Caswell W, Robinson N: Lost in knowledge translation: time for a map? *The Journal of Continuing Education in the Health Professions* 2006, 26, p. 19.



# METHODS



## ADOPT-VR2 Survey (Glegg, 2016)

- Assessing Determinants of Prospective Take-up of Virtual Reality
- 54 Likert-scale items, rated from 1-9
- 3 dimensions, with a total of 11 constructs
  - **Attitude (3)**
    - Perceived usefulness (3)
    - Perceived ease of use (3)
    - Compatibility (2)
  - **Social norms (2)**
    - Client Influence (1)
    - Peer influence (2)
    - Superior influence (2)
  - **Perceived behavioural control (4)**
    - Facilitating conditions and barriers (15 +3 open-ended)
    - Self-efficacy (14 + 1 open-ended)
    - Behavioural intention (3 + 2 open-ended)

> [Games Health J.](#) 2017 Aug;6(4):217-228. doi: 10.1089/g4h.2016.0089.

## Virtual Reality and Active Videogame-Based Practice, Learning Needs, and Preferences: A Cross-Canada Survey of Physical Therapists and Occupational Therapists

[Danielle Levac](#)<sup>1</sup>, [Stephanie Glegg](#)<sup>2 3</sup>, [Heather Colquhoun](#)<sup>4</sup>, [Patricia Miller](#)<sup>5</sup>, [Farzad Noubary](#)<sup>6 7</sup>

Affiliations + expand

PMID: 28816511 DOI: [10.1089/g4h.2016.0089](#)

### Abstract

**Objective:** Describe the clinical use of virtual reality (VR)/active videogaming (AVG) by physical therapists (PTs) and occupational therapists (OTs) in Canada, identify usage barriers and facilitators, evaluate factors that predict intention to use VR/AVGs, and determine therapists' learning needs.



## What We Are Doing

We are building a virtual hub to disseminate resources, the latest research-based findings, and current events related to the use of virtual reality in child healthcare. Our goal is to build a community and connect individuals, organizations, and institutions that share the common interest of improving pediatric healthcare practice using the latest innovative technology.

### Research Study

We are conducting an infrastructure research study at the Ingram School of Nursing, funded by the *Réseau de santé buccodentaire et osseuse*. The study uses a hybrid approach for data collection and seeks to:

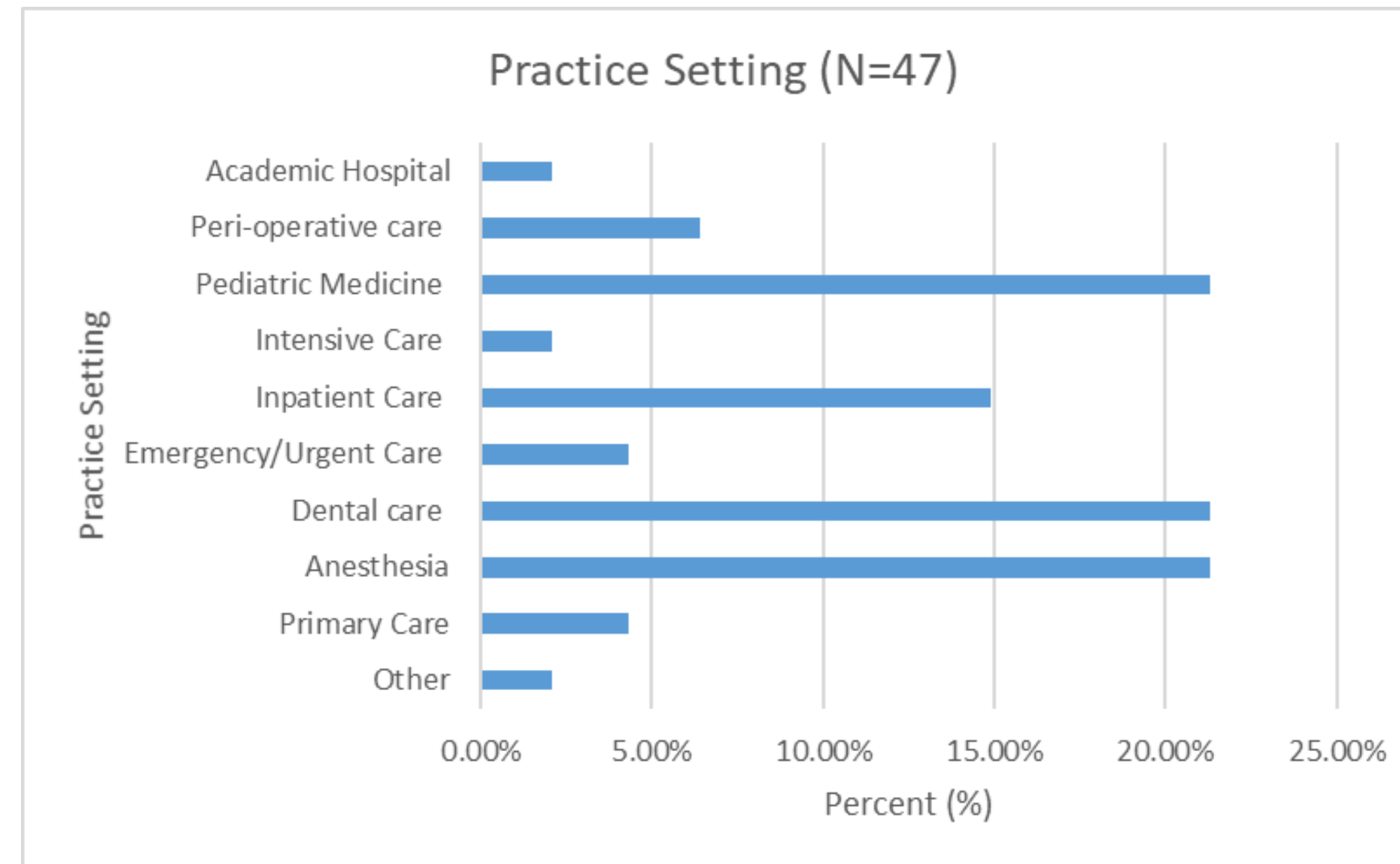
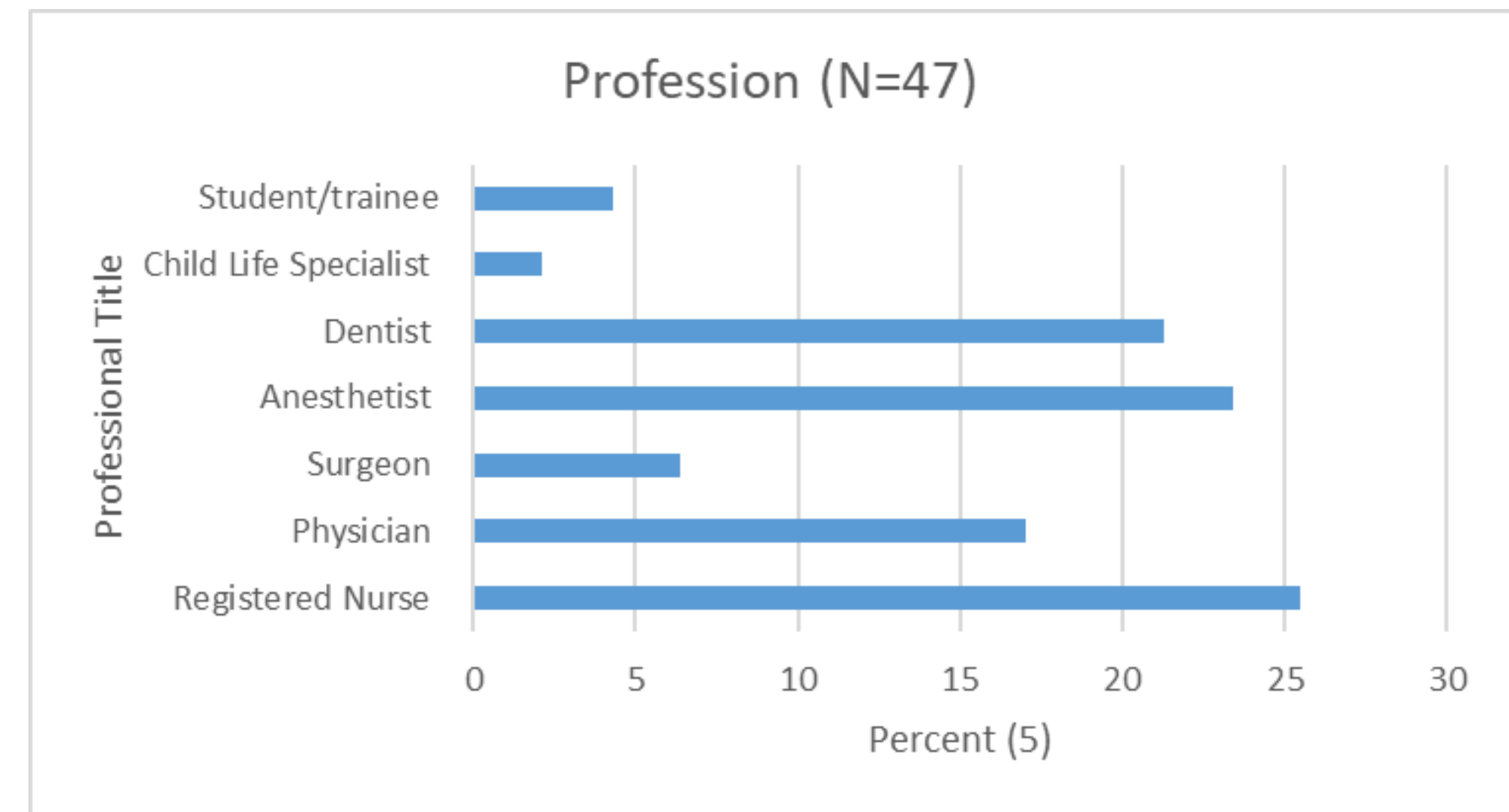
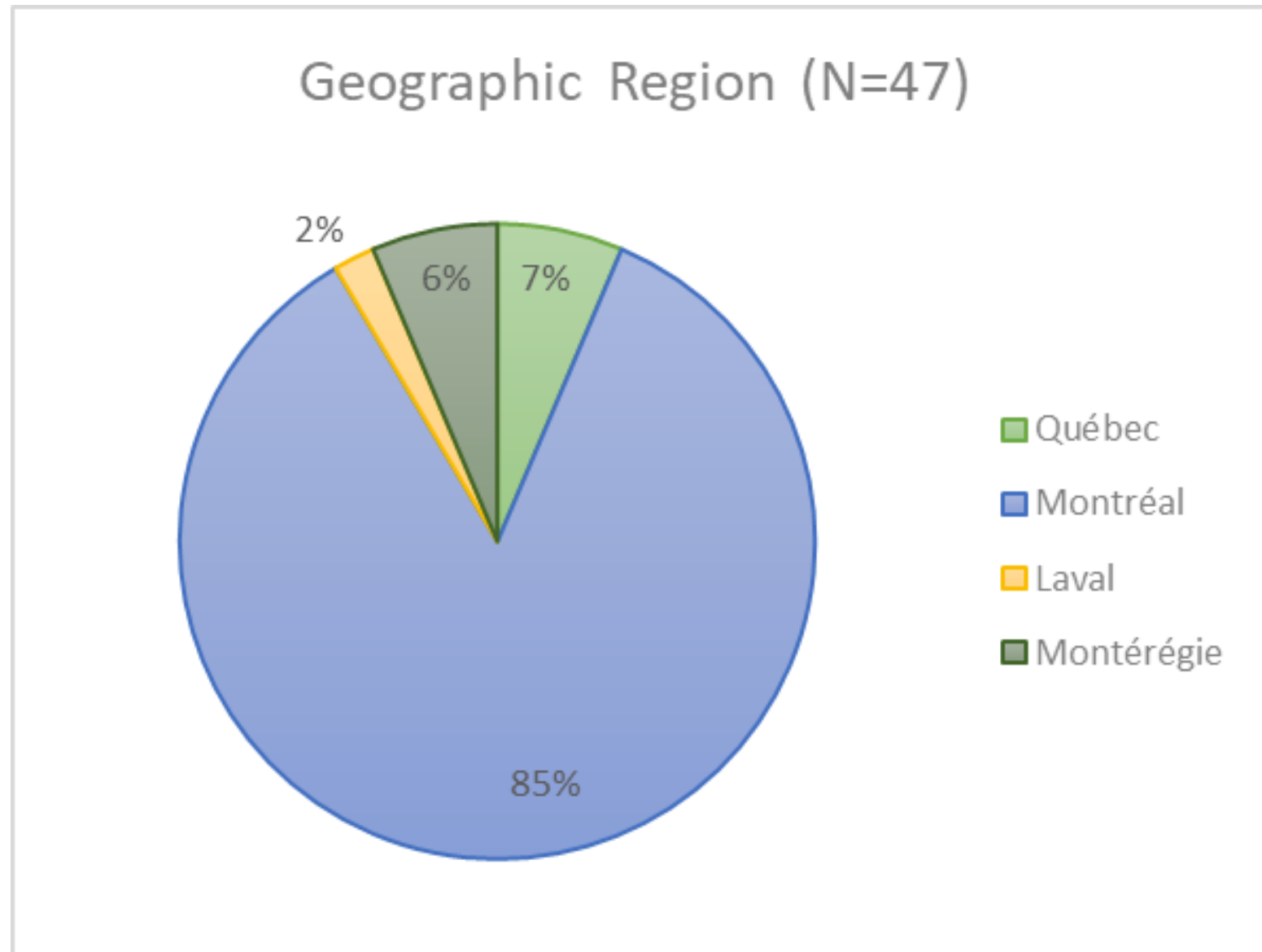
1. Understand the knowledge gaps regarding VR use in child healthcare;
2. Deliver a workshop to train decision makers and healthcare professionals to be VR champions;
3. Co-develop knowledge mobilization resources to facilitate VR implementation.

We are looking for decision-makers and healthcare professionals working in children healthcare settings to tell us about their knowledge needs and to participate in a workshop to learn about VR use. For more information, [complete this questionnaire](#) or scan the QR code below:





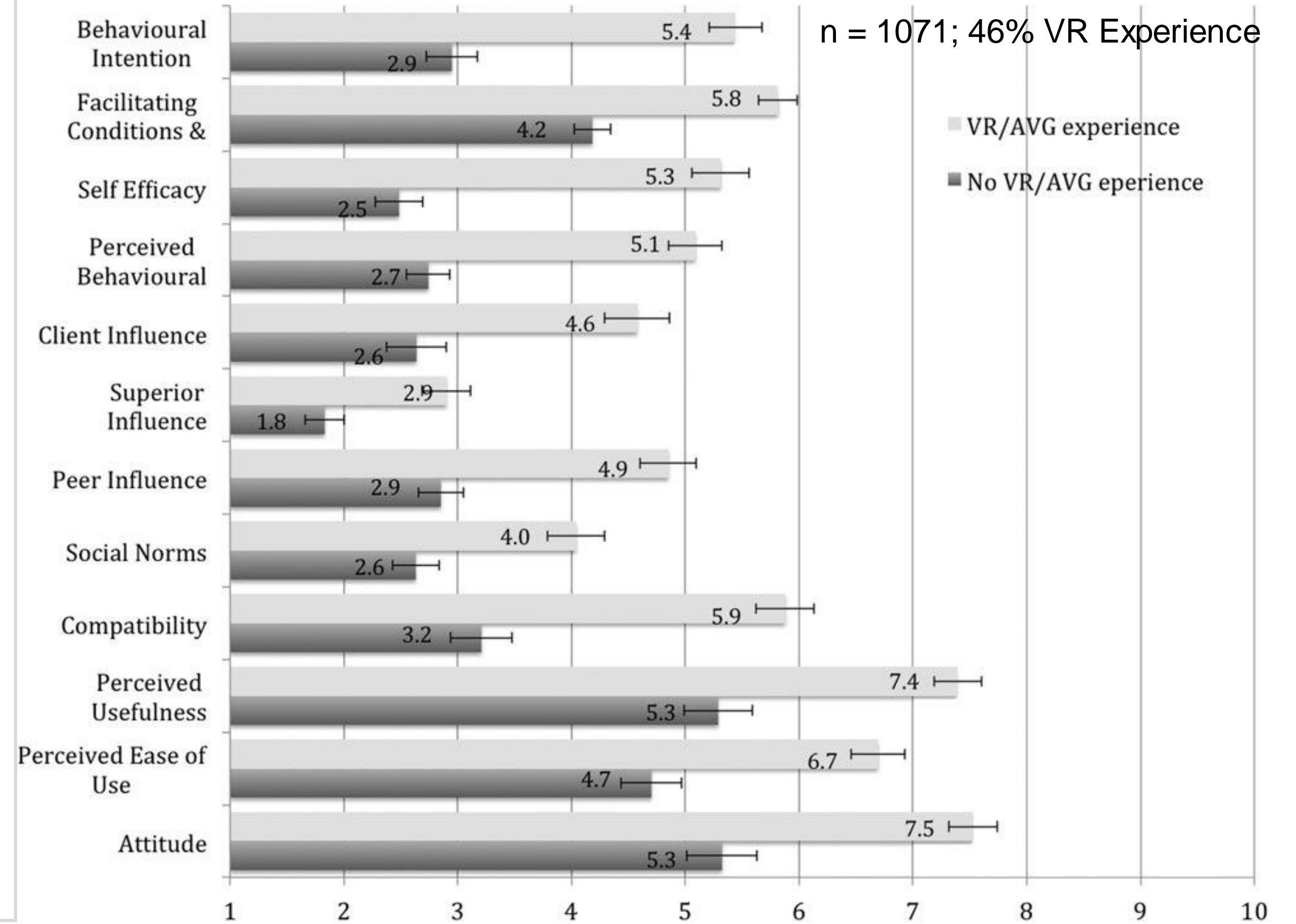
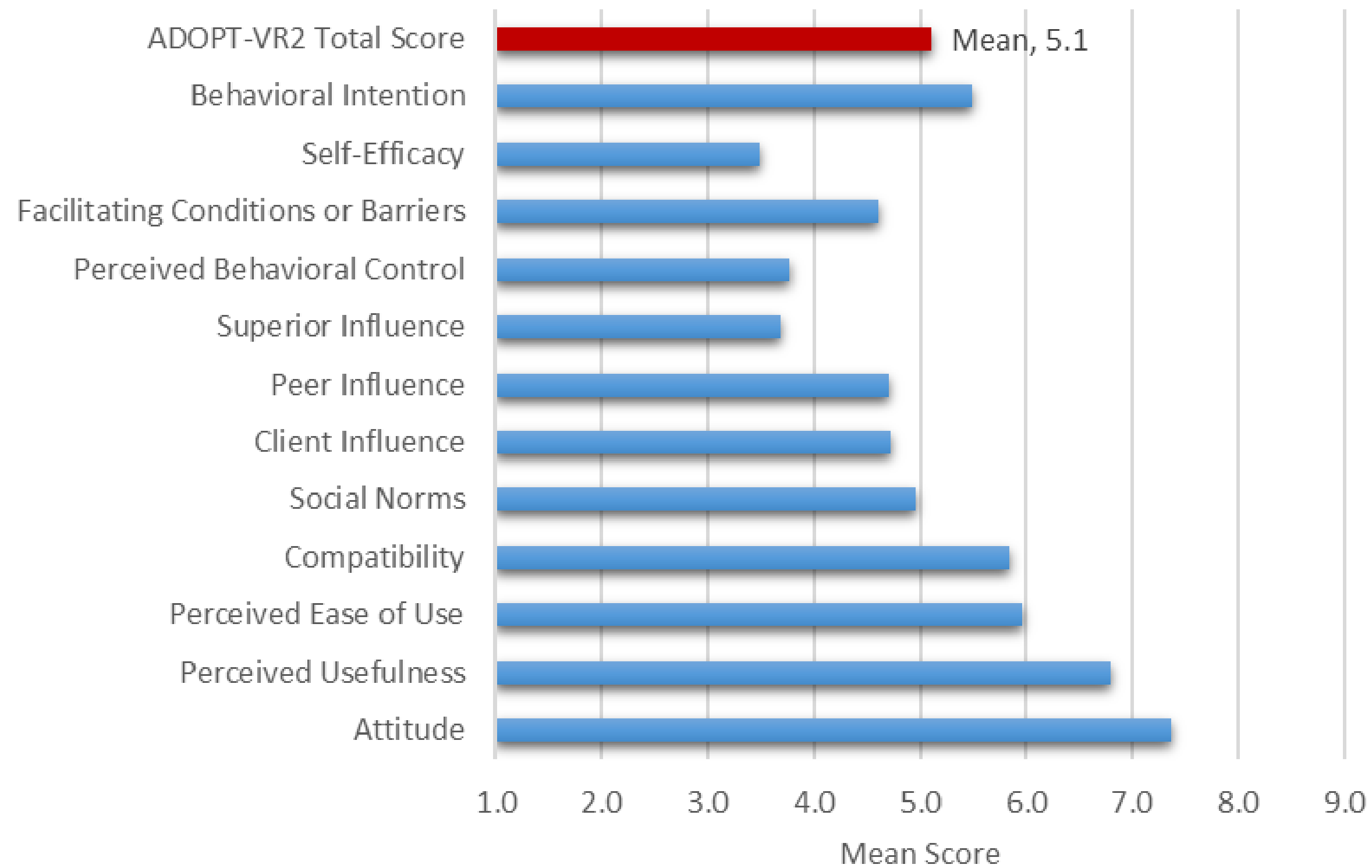
# Sample Characteristics





# ADOPT-VR2: Preliminary Results

**ADOPT-VR2 Constructs Mean Score (N=47)**

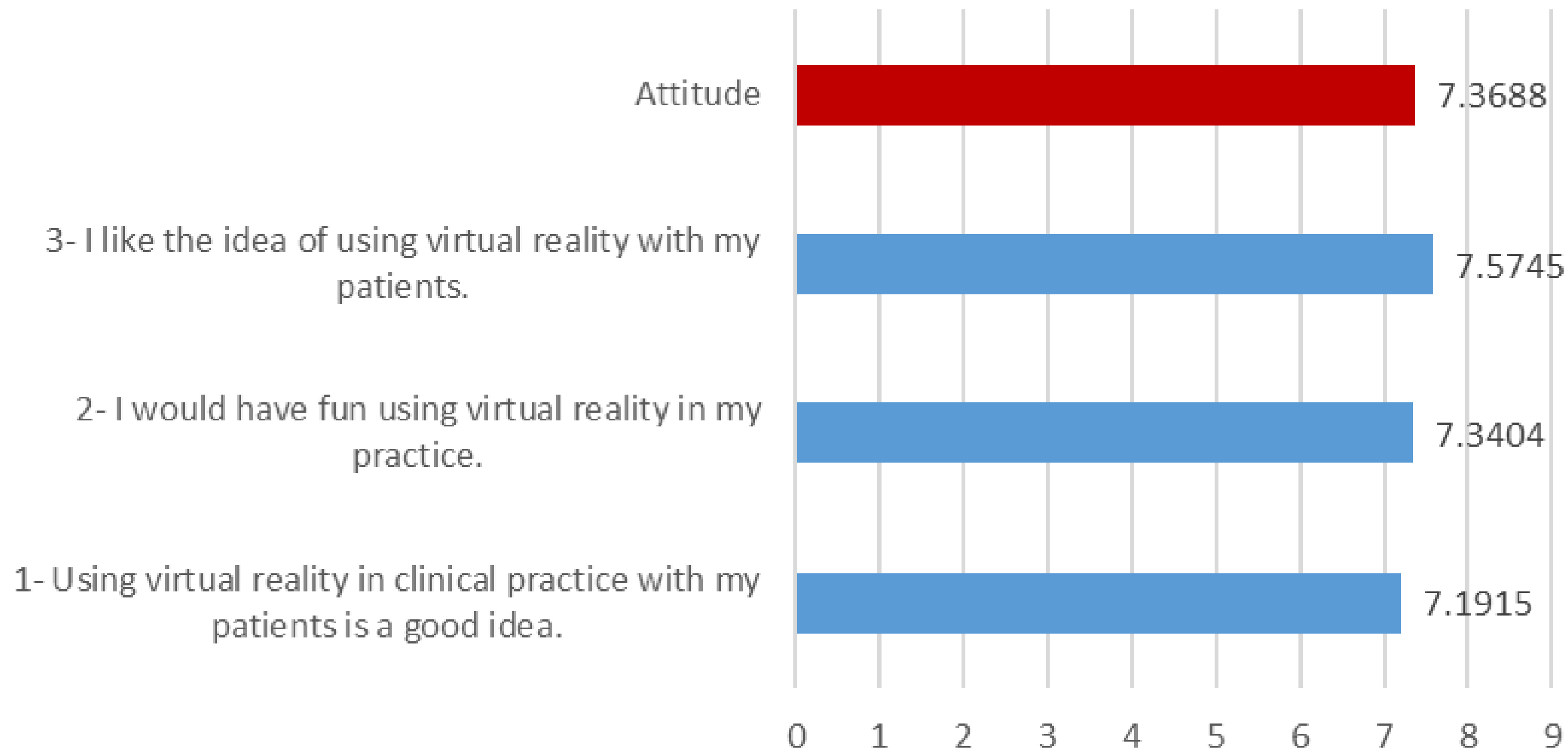




# ADOPT-VR2: Preliminary Results

## ATTITUDE

Attitude (N=47)





# ADOPT-VR2: Preliminary Results

## PERCEIVED USEFULNESS

### Perceived Usefulness (N=47)

Perceived Usefulness

6.7943

3- Virtual reality adds something beyond what my conventional approach for distraction could offer my patients

7.1915

2- Virtual reality provides variety for my patients for distraction during medical procedures.

7.2553

1- Using virtual reality will result in improved health outcomes for my patients

5.9362

0 1 2 3 4 5 6 7 8 9





# ADOPT-VR2: Preliminary Results

## PERCEIVED EASE OF USE

### Perceived Ease of Use (N=47)

Perceived Ease of Use

5.9574

3- I would find virtual reality easy to use.

6.1277

2- It is easy for me to become skillful in using virtual reality.

6.1277

1- Using virtual reality with my patients requires minimal mental effort on my part.

5.617

0 1 2 3 4 5 6 7 8 9



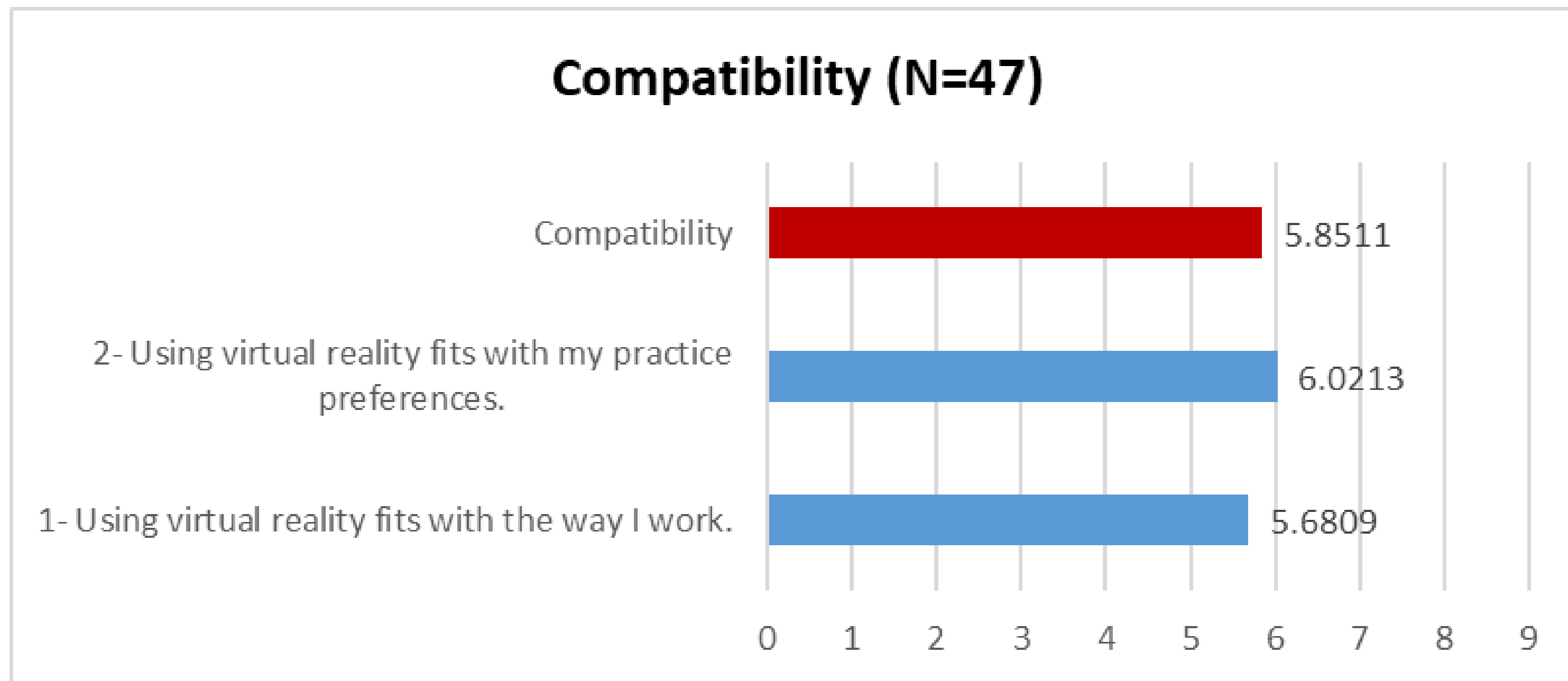
Facility: CANADA		
Department \ Service name: NURSING AND PATIENT CARE SERVICES		
Virtual Reality for Procedural Pain and Anxiety Management		
<input type="checkbox"/> Policy <input type="checkbox"/> Procedure <input checked="" type="checkbox"/> Policy and procedure <input type="checkbox"/> Protocol	<input type="checkbox"/> Guidelines <input type="checkbox"/> Collective order <input type="checkbox"/> Manual	<input type="checkbox"/> Plan <input type="checkbox"/> Form <input type="checkbox"/> Annex
Document No:		





# ADOPT-VR2: Preliminary Results

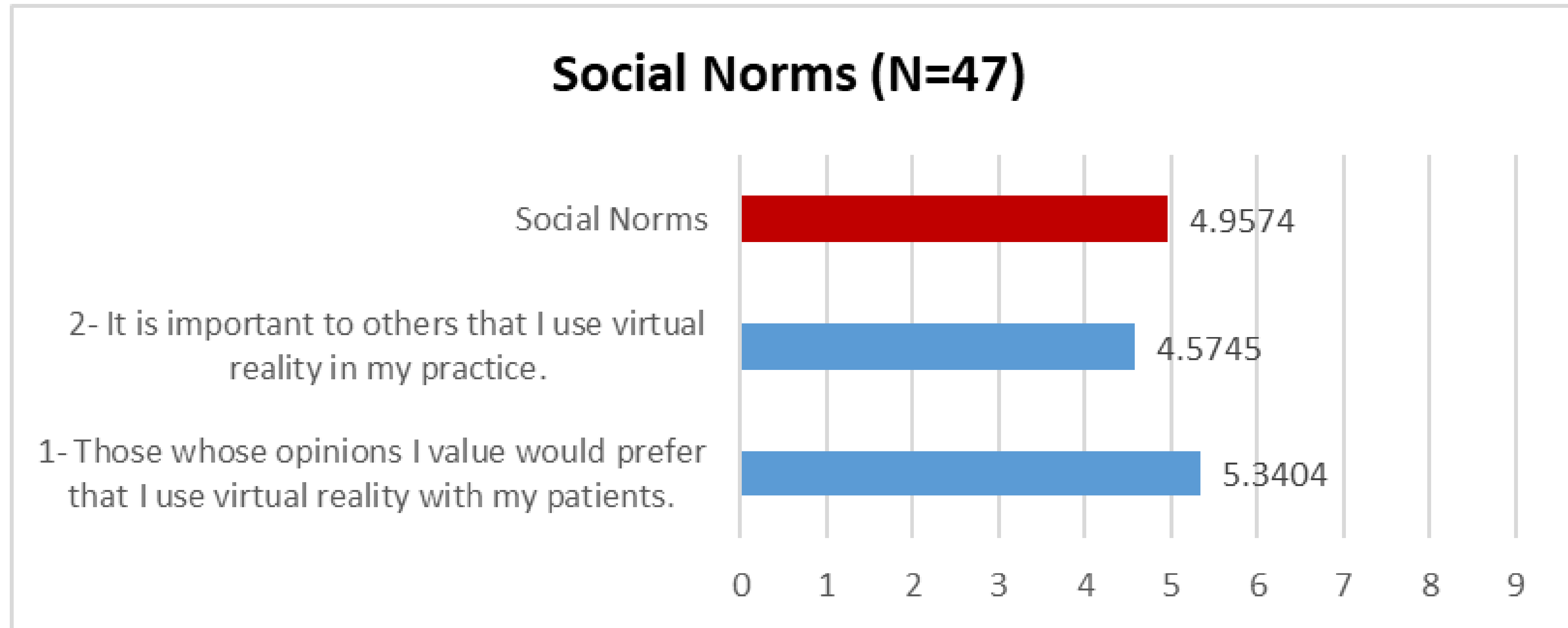
## COMPATIBILITY





# ADOPT-VR2: Preliminary Results

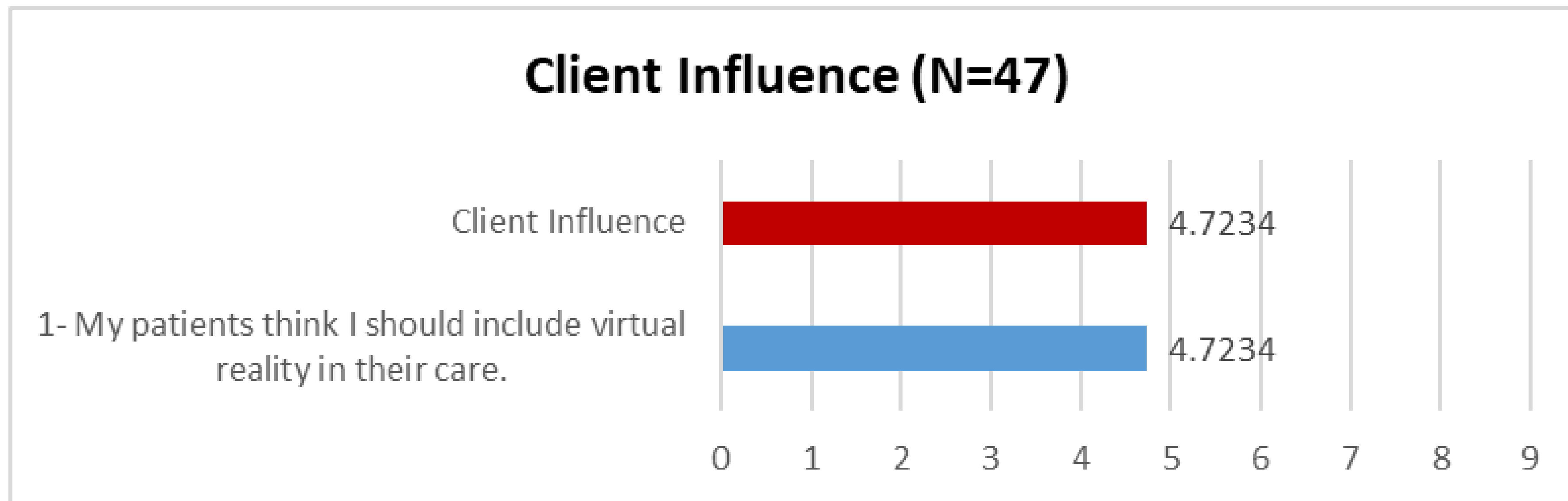
## SOCIAL NORMS





# ADOPT-VR2: Preliminary Results

## CLIENT INFLUENCE







**Hôpital Shriners : la réalité virtuelle pour atténuer les craintes**



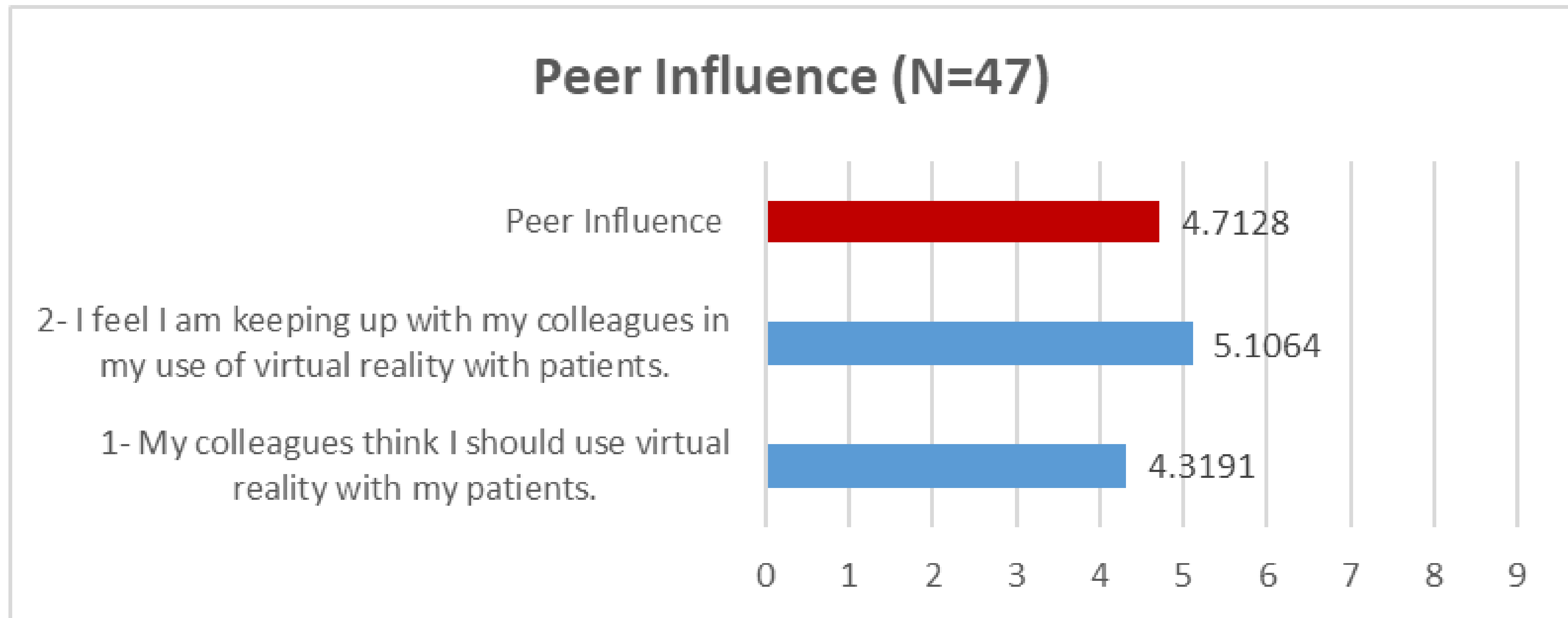
**Hôpital Shriners : la réalité virtuelle pour atténuer les craintes**





# ADOPT-VR2: Preliminary Results

## PEER INFLUENCE

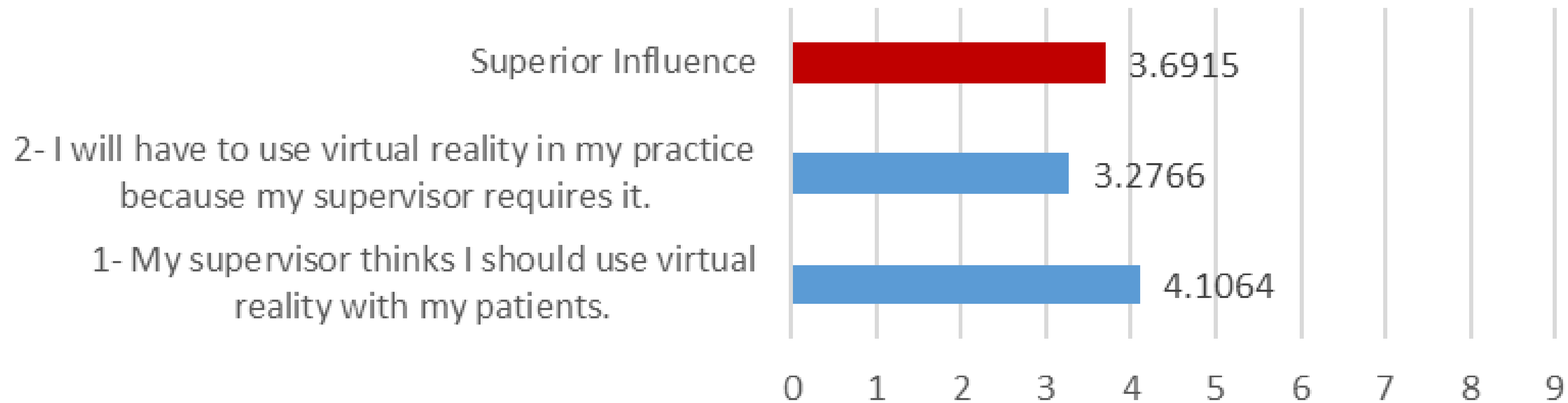




# ADOPT-VR2: Preliminary Results

## SUPERIOR INFLUENCE

### Superior Influence (N=47)

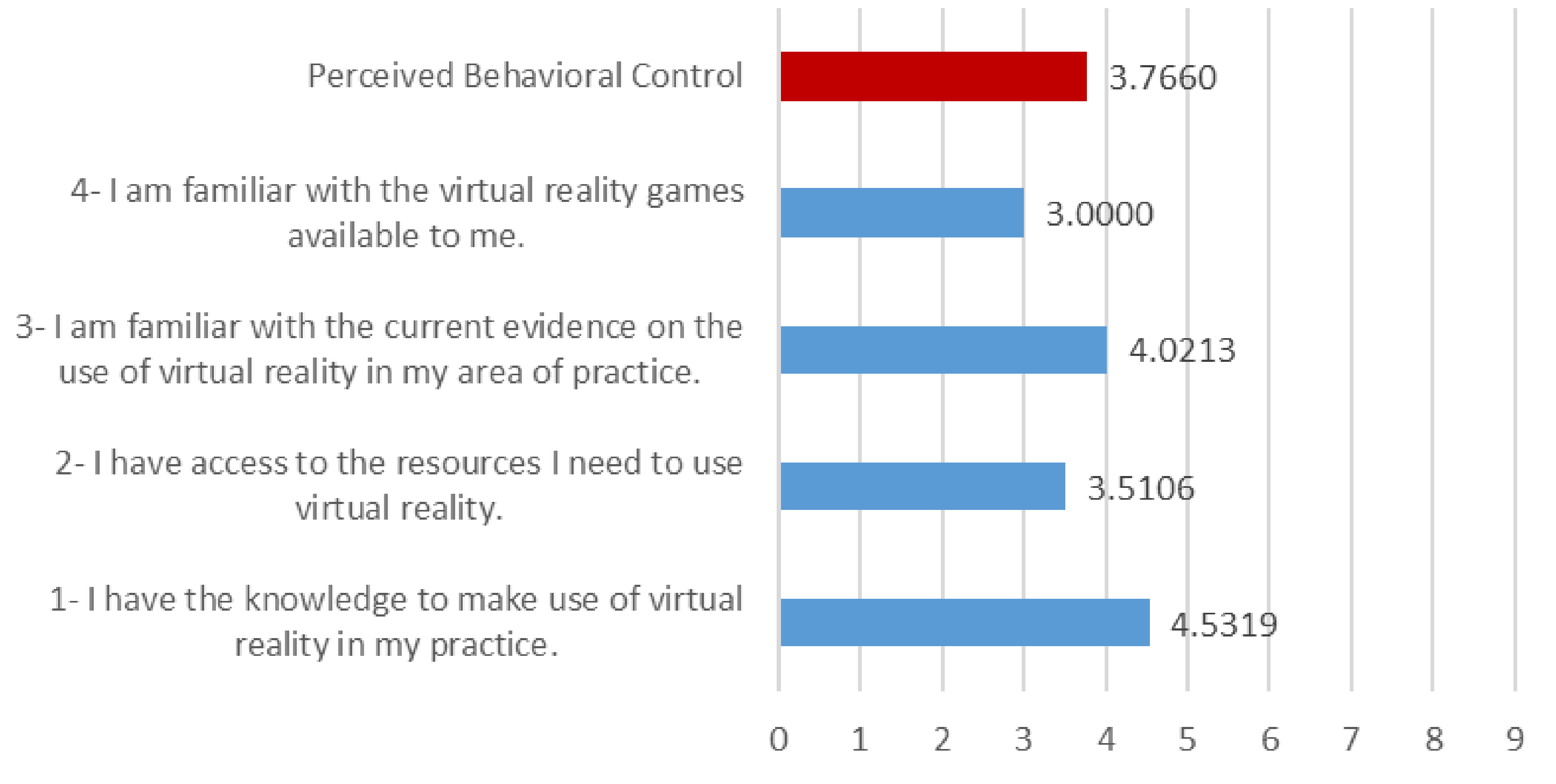




# ADOPT-VR2: Preliminary Results

## PERCEIVED BEHAVIOURAL CONTROL

### Perceived Behavioral Control (N=47)



**VR SOFTWARES IN PEDIATRIC ANESTHESIA** *in the literature*

WHAT KIND OF SOFTWARE HAS BEEN USED IN PEDIATRIC ANESTHESIA?

#### DISTRACTION

IMMERSE THE PLAYER IN AN INTERACTIVE FANTASTIC OR IMAGINARY WORLD TO PROMOTE DISTRACTION.

- TYPICALLY INVOLVES COMPLETING SIMPLE TASKS IN A VIRTUAL WORLD, SUCH AS TRAVELLING WHILE PICKING UP ITEMS OR THROWING OBJECTS AT A TARGET TO ACQUIRE POINTS
- MAY REQUIRE A HAND CONTROLLER, HEAD MOTION, OR USE OF EYE-TRACKING.
- OFFERS SHORT TERM ANXIETY AND PAIN RELIEF
- SIGNIFICANTLY REDUCED ANXIETY IN CHILDREN DURING INDUCTION OF ANESTHESIA IN A RCT BY JUNG ET AL [1]
- FOR DISTRACTION DURING MEDICAL PROCEDURES, AVOID GAMES INVOLVING LARGE BODY MOVEMENTS

#### MINDFULNESS

CREATE AN IMMERSIVE, CALMING ENVIRONMENT THAT PROMOTES MINDFULNESS AND RELAXATION.

- MAY INVOLVE GUIDED MEDITATIONS, DEEP BREATHING EXERCISES, MINDFULNESS PROMOTION, ETC.
- COULD ALSO BE BIOFEEDBACK-BASED BY PROVIDING REAL TIME PHYSIOLOGICAL DATA TO PROMOTE BEHAVIORAL RESPONSES, INFLUENCING THEIR CURRENT EMOTIONAL STATE.
- GENERALLY DO NOT REQUIRE CONTROLLER NOR HEAD MOVEMENT
- CAN GENERALLY BE USED IN ANY POSITION: SUPINE, SEATED, LATERAL DECUBITUS

#### SOFTWARE EXAMPLES

##### SNOW WORLD [3]

- FIRST VR SOFTWARE DESIGNED FOR PAIN REDUCTION IN THE HEALTHCARE SETTING
- DEVELOPED BY THE WASHINGTON HETLAD WITH THE HARBORVIEW BURN CENTER
- THE PLAYER THROWS SNOWBALLS AT CHARACTERS IN A SNOWY LANDSCAPE
- REDUCES PAIN IN BURN PATIENTS, REDUCING INTRAVENOUS PAIN WITH THE MORE PLEASANT EMULATED COLD ENVIRONMENT TO INFLUENCE PAIN PERCEPTION [2, 3]
- ALSO STUDIED IN OTHER SETTINGS INCLUDING VASCULAR ACCESS
- WHERE IT REDUCED PAIN SCORES [4]
- ONE OF THE MOST EXTENSIVELY STUDIED SOFTWARES

##### SPACE PUPS [5]

- DEVELOPED BY THE CHAOST PROGRAM AT LUCILE PACKARD CHILDREN'S HOSPITAL STAMFORD
- THE PLAYER STEERS A DOG DOWN A HIGHWAY IN OUTER SPACE COLLECTING TREATS
- POSSIBILITY OF ADJUSTING THE COGNITIVE LOAD DURING THE GAME DURING PERIODS OF INCREASED PAIN OR STRESS OF THE PROCEDURE
- EFFECTIVE IN NUMEROUS CLINICAL SETTINGS, INCLUDING VASCULAR ACCESS, EPIDURAL PLACEMENT, AND PERIOPERATIVE SETTINGS [5]

##### BIOFEEDBACK SOFTWARE [6]

ThoughtTech

- EMPLOYS THE PROCOMP INFOMITZ SYSTEM TO GATHER PHYSIOLOGICAL DATA INCLUDING THE GALVANIC SKIN RESPONSE, WHICH IS PROCESSSED TO PROVIDE REAL-TIME VISUAL FEEDBACK BASED ON THE PATIENT'S EMOTIONAL STATE AS THEY TRY TO RELAX. VISUAL REPRESENTATIONS OF PAIN FACE AS THEY SUCCESSFULLY RELAXES
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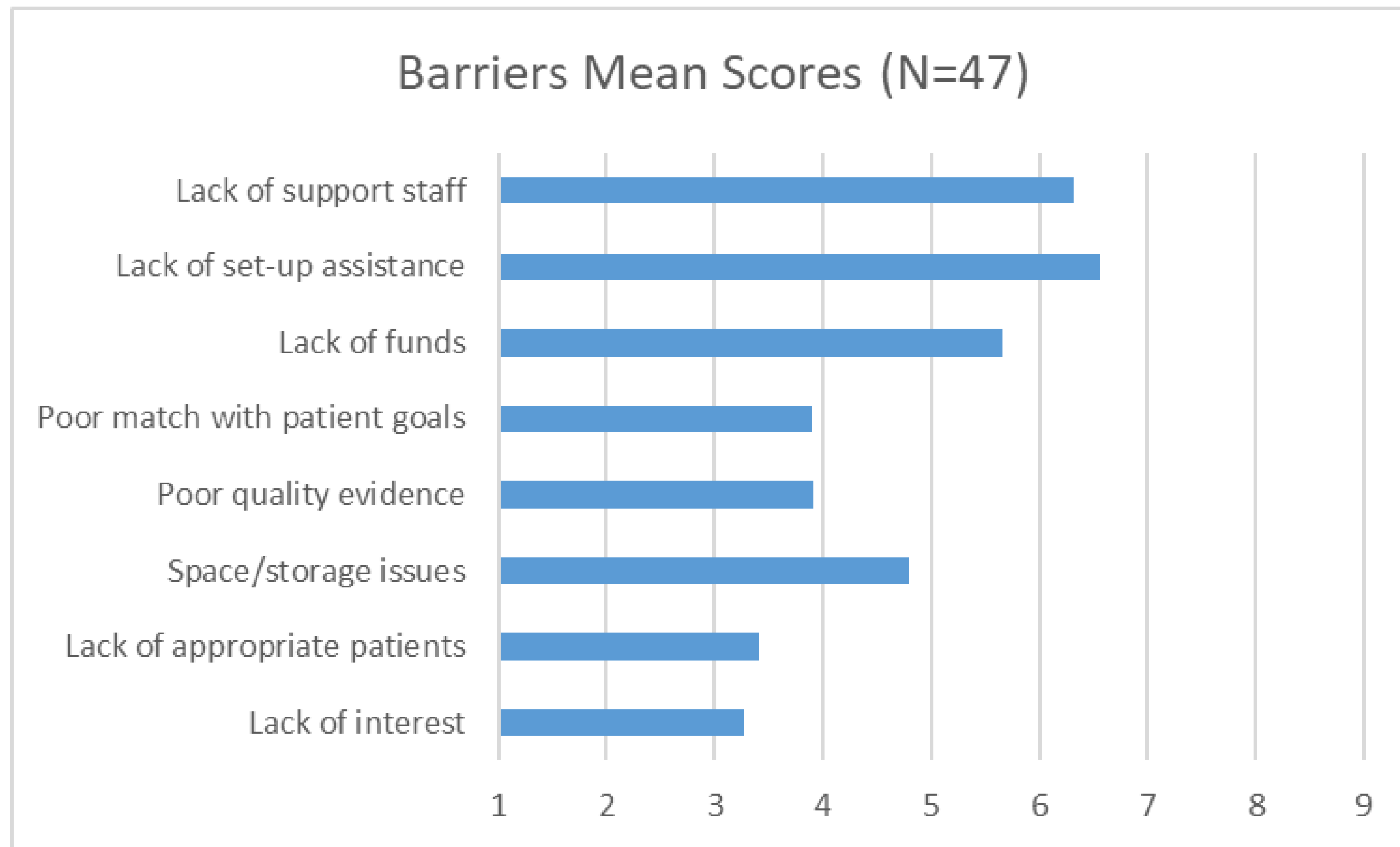
##### NATURE TREKS [7]

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- COMMERCIALY AVAILABLE ON QUEST AND METAQUEST PLATFORMS



# ADOPT-VR2: Preliminary Results

## BARRIERS





# ADOPT-VR2: Preliminary Results

## BARRIERS

### Other barriers:

- Discipline/field specific VR programs
- Designing RCT studies (blinding)
- Other distractions are less costly and less time consuming
- Patient and staff expectations
- Compatibility with specific procedures (i.e. mask induction)
- Involuntary patient movements during VR
- Technical issues during use; requires back up tools
- Patient unavailable during treatment

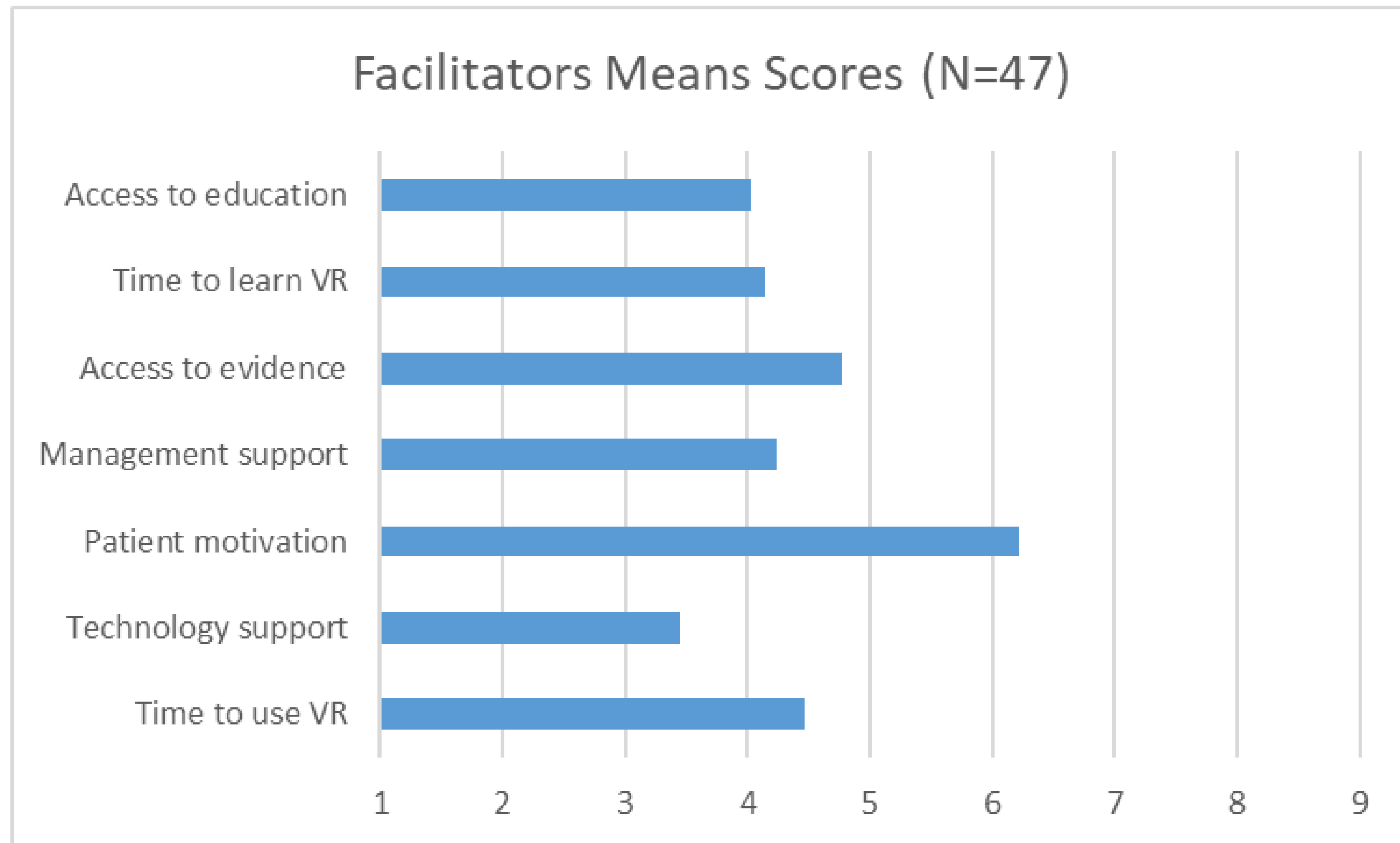
### Most significant barriers:

- Lack of training (n=2)
- Finding appropriate patients (n=2) i.e. neurodivergent patients
- Finding the right procedure
- Financial resources (n=2)
- Access to technology (n=3)
- Lack of evidence/knowledge transfer (n=2)
- Lack of support staff (n=2)
- Lack of training
- Involuntary patient movements during VR



# ADOPT-VR2: Preliminary Results

## FACILITATORS



What has helped you to incorporate virtual reality into your practice?

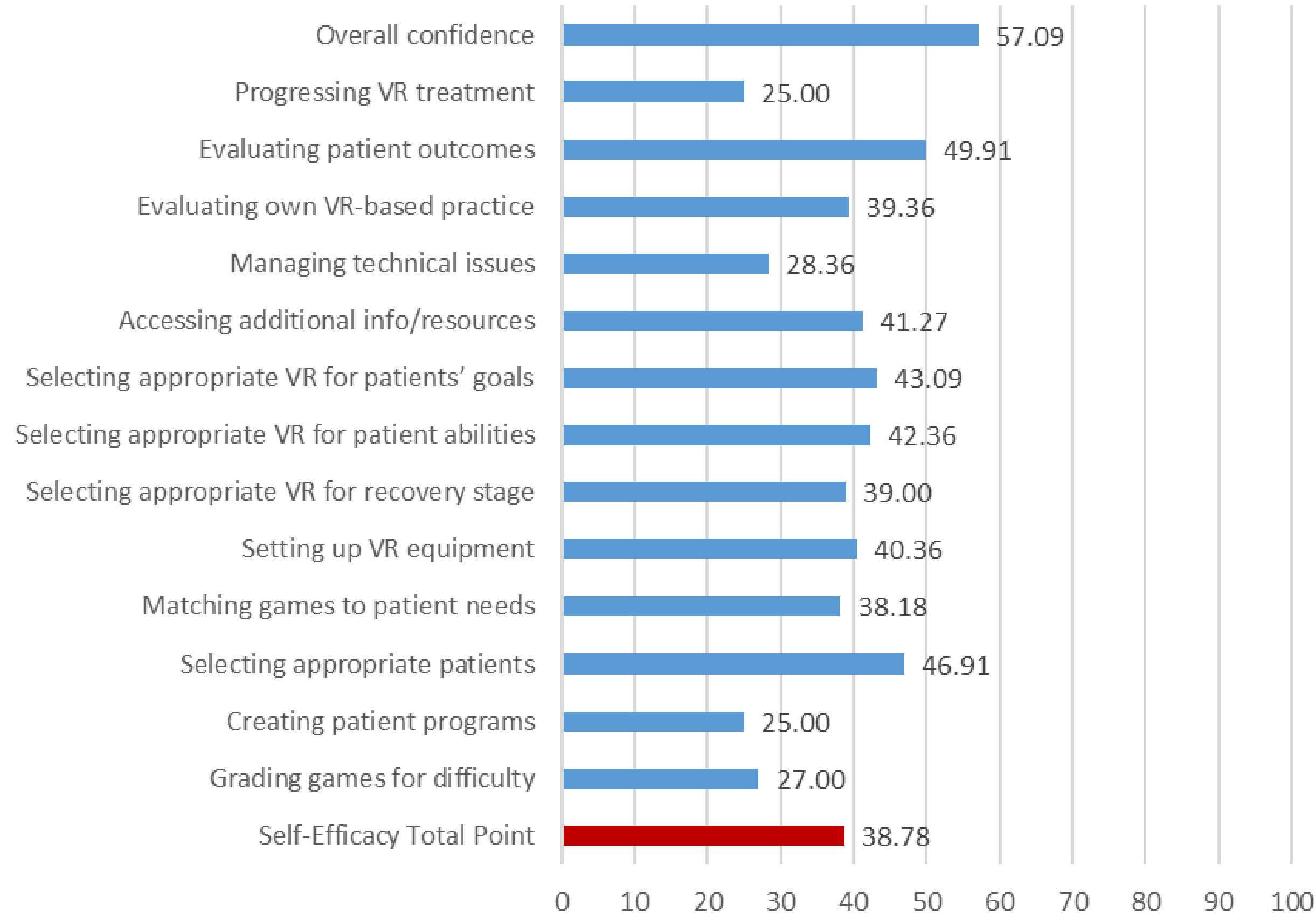
- Research study (n=3)
- Patient wellbeing



# ADOPT-VR2: Preliminary Results

## SELF-EFFICACY

Self-Efficacy Mean Scores (N=47)



### Other areas where lacking confidence

- Hardware
- Specific training on VR equipment available in facility
- Need support from CCLS
- Use of VR in adults
- Tech troubleshooting
- Adapting games based on patient needs
- Identifying good candidates
- Need to know about age appropriate games
- Not sure



# Virtual Reality Hardware Guide

A guide to help you understand the key hardware components important for a safe and immersive VR experience.

## Display Resolution

- The higher the pixel density, the better the display resolution, improving gaming performance, and reducing motion sickness and eye strain.

## Refresh Rate

- A higher refresh rate means images are updated more frequently, minimizing the discrepancy between head movements and display updates, reducing motion sickness, enhancing sense of presence, realism, and comfort.
- Ranges between 75 Hz to 120 Hz for VR.

## Field of View (FoV)

- The wider the FoV, the more of the VR world you can see without turning your head or eyes, increasing sense of immersion and realism, and reducing motion sickness, nausea, and disorientation.
- VR FoV ranges from 90 to 110 degrees.

## Foveated Rendering

- High resolution at gaze focus, with gradually decreasing resolution towards the periphery improves performance and reduces cybersickness by 66%.

## Central Processing Unit (CPU)

- The control center that processes and interprets what is going on in VR and executes instructions, allowing to run a smooth VR experience.

## Graphics Processing Unit (GPU)

- A video card, responsible for rendering realistic graphics in VR.

## Random Access Memory (RAM)

- Short-term memory of VR which minimizes lags and interruptions in the VR experience (min 8GB).

## Motion Tracking

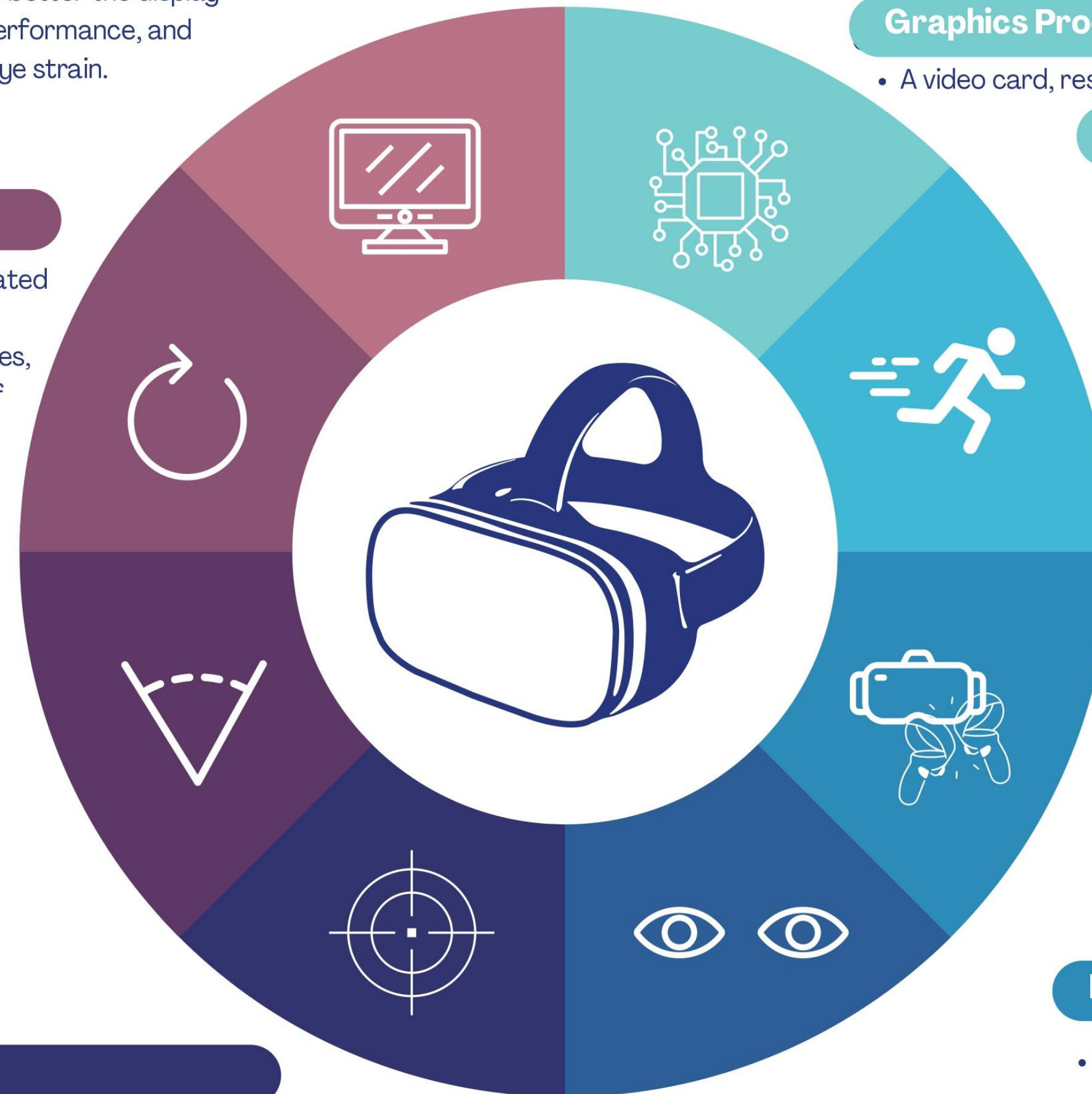
- Sensors monitor the movement and position of the user's head (and/or controllers) within the VR environment.
- Establishes a reliable connection between the user and the VR world, enhancing realism, ensuring safety, and reducing motion sickness.
- A higher **tracking frequency** (Hz) reduces the perceived lag between user actions and virtual responses, reducing cybersickness.
- **Degrees of Freedom** (DoF) refer to the number of ways you can move in 3D space.
  - 3DoF: conducive to static VR experiences.
  - 6DoF: suited for interactive VR experiences.

## Headset and Controller Design

- Lightweight headset with balanced weight distribution, adjustable straps, cushioned padding, and built-in wireless/Bluetooth connectivity.
- Foam face mask or silicone mask for easy disinfection between uses.
- Capacitive buttons for those with limited hand strength/dexterity.

## Interpupillary Distance (IPD)

- The distance between a person's pupils (IPD) must match the VR headset IPD to avoid visual discomfort, poor depth perception, eye strain, and distorted image.

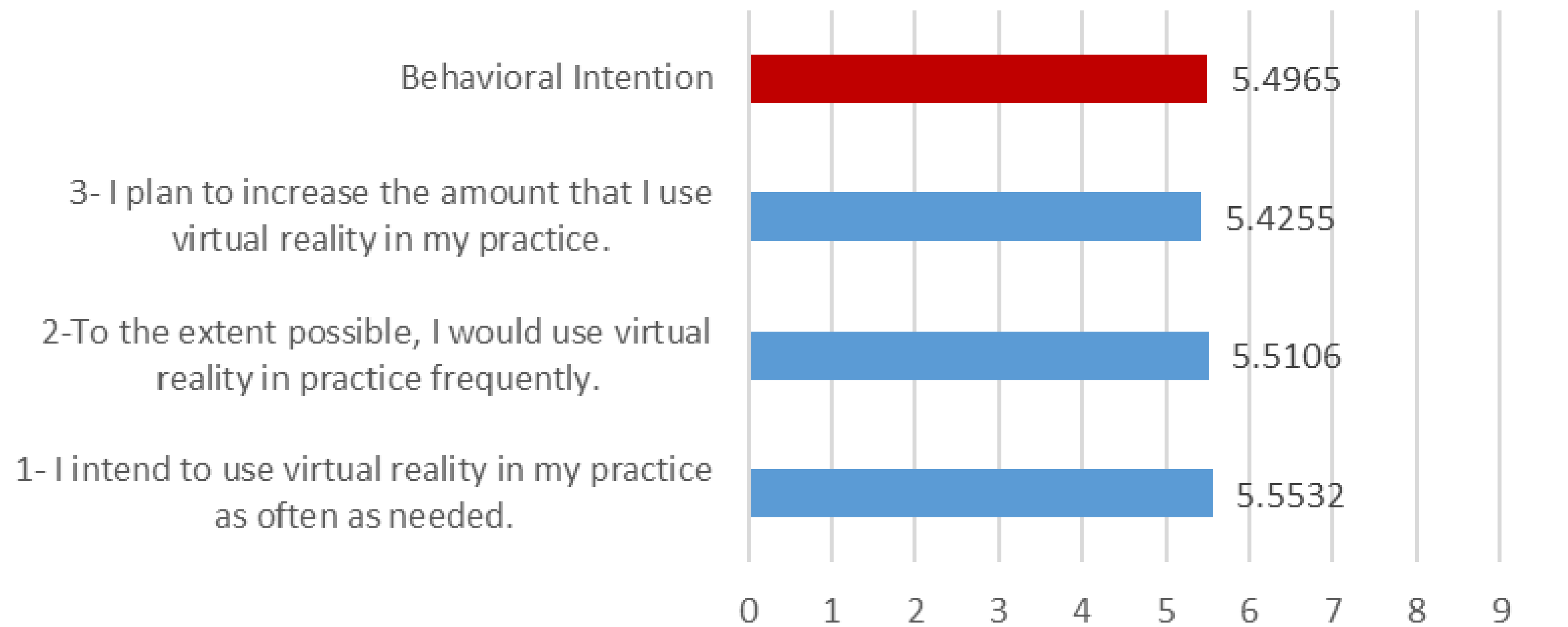




# ADOPT-VR2: Preliminary Results

## BEHAVIOURAL INTENTION

### Behavioral Intention (N=47)



### VR SOFTWARES IN PEDIATRIC ANESTHESIA *in the literature*

WHAT KIND OF SOFTWARE HAS BEEN USED IN PEDIATRIC ANESTHESIA?

#### DISTRACTION

IMMERSE THE PLAYER IN AN INTERACTIVE FANTASTIC OR IMAGINARY WORLD TO PROMOTE DISTRACTION.

- TYPICALLY INVOLVES COMPLETING SIMPLE TASKS IN A VIRTUAL WORLD, SUCH AS TRAVELLING WHILE PICKING UP ITEMS OR THROWING OBJECTS AT A TARGET TO ACQUIRE POINTS
- MAY REQUIRE A HAND CONTROLLER, HEAD MOTION, OR USE OF EYE-TRACKING.
- OFFERS SHORT TERM ANXIETY AND PAIN RELIEF
- SIGNIFICANTLY REDUCED ANXIETY IN CHILDREN DURING INDUCTION OF ANESTHESIA IN A RCT BY JUNG ET AL [1]
- FOR DISTRACTION DURING MEDICAL PROCEDURES, AVISD GAMES REDUCING LARGE BODY MOVEMENTS

#### MINDFULNESS

CREATE AN IMMERSIVE, CALMING ENVIRONMENT THAT PROMOTES MINDFULNESS AND RELAXATION.

- MAY INVOLVE GUIDED MEDITATIONS, DEEP BREATHING EXERCISES, MINDFULNESS PROMOTION, ETC.
- COULD ALSO BE BIOFEEDBACK-BASED BY PROVIDING REAL TIME PHYSIOLOGICAL DATA TO PROMOTE BEHAVIORAL RESPONSES, INFLUENCING THEIR CURRENT EMOTIONAL STATE.
- GENERALLY DO NOT REQUIRE CONTROLLER NOR HEAD MOVEMENT
- CAN GENERALLY BE USED IN ANY POSITION: SUPINE, SEATED, LATERAL DECUBITUS

#### SOFTWARE EXAMPLES

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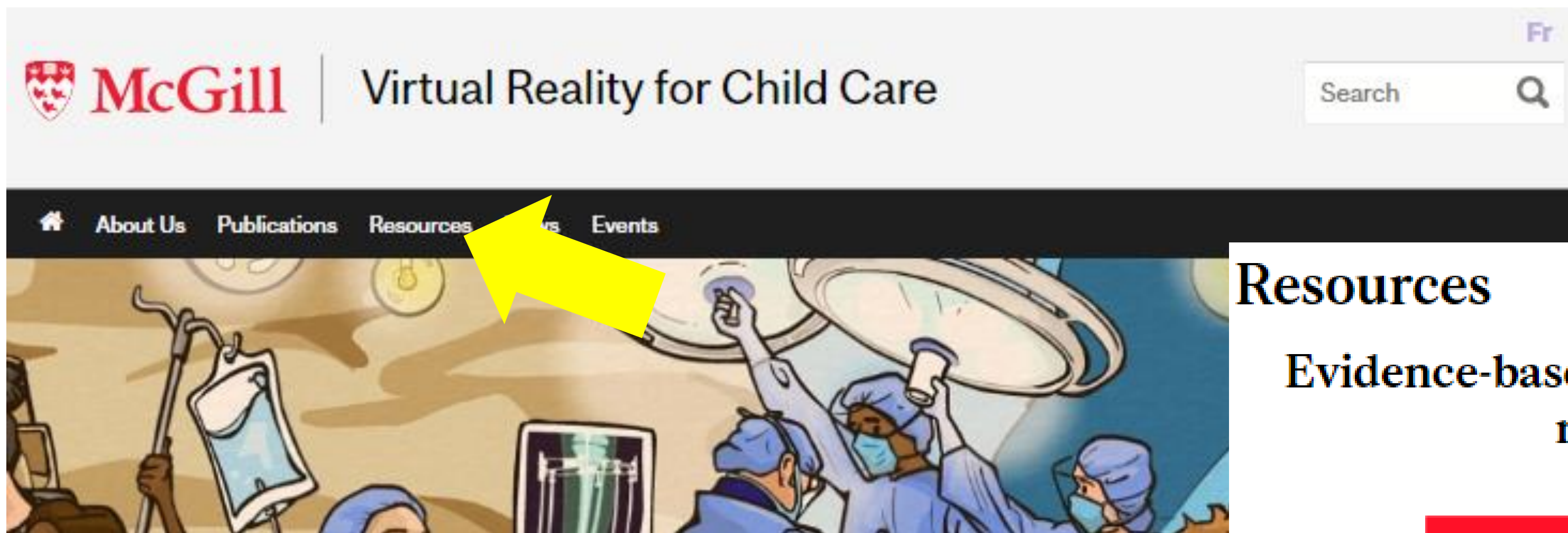
# Co-Development of Resources



## DEVELOPING RESOURCES

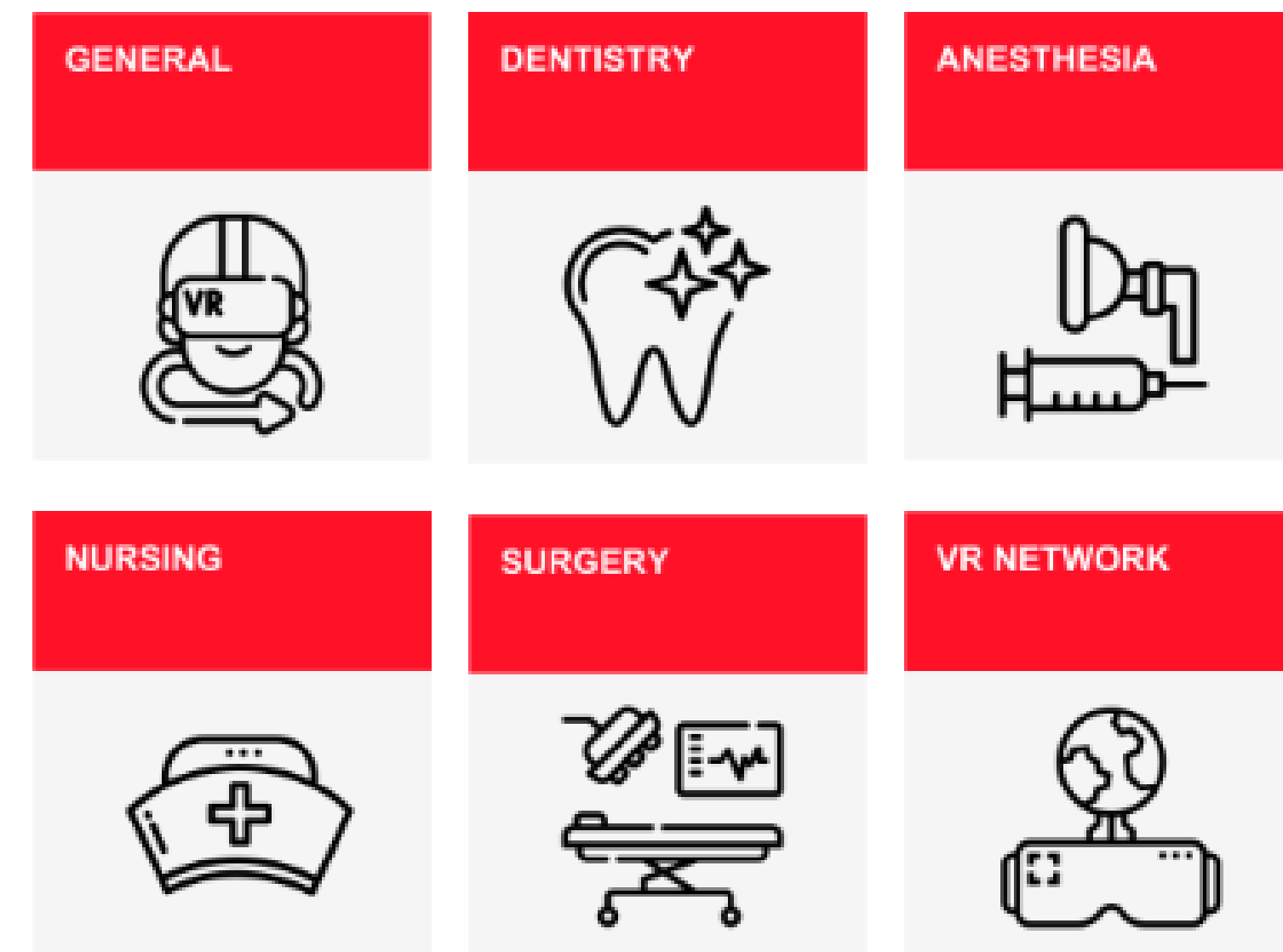
- Based on preliminary survey analysis and previous implementation project, we have co-developed resources to disseminate research findings about VR and facilitate VR use





## Resources

Evidence-based tools to help you implement virtual reality into your practice.



## DEVELOPING RESOURCES

- Current resources:
  - Research summaries
  - Step-by-step guides
  - Policy & procedure
  - Patient materials
- Further material will be co-developed based on the workshop discussions
- Resources are published on the VRCC website



# RESOURCES

Ongoing development of resources to disseminate VR research and facilitate use of VR.



## VIRTUAL REALITY FINDING THE RIGHT VIRTUAL REALITY INTERVENTION FOR YOUR HOSPITAL

**VIRTUAL REALITY (VR)**

**VR SOFTWARES IN PEDIATRIC ANESTHESIA** *in the literature*

WHAT KIND OF SOFTWARE HAS BEEN USED IN PEDIATRIC ANESTHESIA?

**DISTRACTION** IMMERSE THE PLAYER IN AN INTERACTIVE FANTASY OR IMAGINARY WORLD

**MINDFULNESS** CREATE AN IMMERSIVE, CALMING ENVIRONMENT

**HOW TO USE VIRTUAL REALITY FOR INDUCTION OF ANESTHESIA**

**WHY USE VIRTUAL REALITY?**

Virtual reality (VR) is an effective and immersive non-pharmacological tool to help patients cope with pain and anxiety and improve the family's hospital experience. Some parents may worry that their child will panic before or during the induction. Pre-operative operating room (OR) tour or distraction by VR in the waiting room (1) and/or distraction by VR during induction (2) can help reduce anxiety and potentially improve induction compliance.

- REVIEW CONTRAINDICATIONS TO VR**
  - Age less than 2 years old
  - History of fits or seizures
  - Severe or altered mental status
  - Patients who cannot be fully connected with headset
  - Recent or current ear infection
  - Recent or current eye infection
  - Recent or current ear pain
  - Recent or current ear surgery
  - Recent or current ear injury
- EXPLORE INTEREST FOR VR AND NEED FOR DISTRACTION**
  - Obtain consent for VR
  - Offer alternative distractions.
- DEVELOP A COMMUNICATION PLAN**
  - Does the child prefer keeping the VR away from the OR or do they prefer seeing what is happening?
  - How should the child signal discomfort or desire to stop VR?
  - Does the child prefer being walked through the various steps up until induction?
  - Do they want to see the OR?

Let them know that they will be receiving data from other members of the healthcare team and that instructions may be available. Inform the healthcare team of the plan to use VR and provide information by removing interruptions if possible.
- SELECT AN APPROPRIATE SOFTWARE WITH THE CHILD**
  - Interactive games
  - Video/Movie/TV show
  - Mindfulness/relaxation/biofeedback-based
  - Educational or exposure-based (pre-op only)

Depending on what is available at your institution for more information, see: Software categories
- FIT HEADSET AND START VR**
  - The child may begin to play VR in the pre-operative holding area.

A NUMBER OF RANDOMIZED CONTROLLED TRIALS SUGGEST THAT SIMPLY USING VR IN THE WAITING ROOM PRIOR TO BRINGING THE PATIENT INTO THE OR REDUCES SIGNIFICANTLY ANXIETY [1].

The patient should not be in VR for more than 20 minutes in a row to prevent cybersickness and disorientation. If the patient is interested in keeping the headset inside the OR, make sure to store the headset in the expected time of surgery, or to take 10-15 minute breaks in between 20-minute sessions. Aim for 5 minutes of VR immediately prior to the procedure.
- BRING PATIENT TO OR**
  - Reassess the child's level of anxiety and the effectiveness of continuing VR for induction.
  - Keep in mind that some signs that occur during VR interventions.
  - Determine if induction of anesthesia will be done by intravenous route or inhalational.
  - Initiate the process of induction as planned.
  - The respiratory therapist and anesthesia caregiver need to be comfortable keeping an airway mask and with the headset, which may be a challenge depending on the headset and the child. As such, it may need to be removed for induction.
  - Need for rapid access to pre- and post-operative interventions of VR before induction.

### 1. TARGET USERS & NEEDS ASSESSMENT

- Why? Identify based on empirical evidence.
- Where? Identify departments that benefit from VR.
- Who? Identify target users.
- What? Evaluate needs, level of engagement, and perceptions of VR.

### Virtual Reality Hardware Guide

A guide to help you understand the key hardware components important for a safe and immersive VR experience.

- Central Processing Unit (CPU)**
  - The control center that processes and interprets what is going on in VR and executes instructions, allowing to run a smooth VR experience.
- Graphics Processing Unit (GPU)**
  - A video card, responsible for rendering realistic graphics in VR.
- Random Access Memory (RAM)**
  - Short-term memory of VR which minimizes lags and interruptions in the VR experience (min 8GB).
- Motion Tracking**
  - Sensors monitor the movement and position of the user's head (and/or controllers) within the VR environment.
  - Establishes a reliable connection between the user and the virtual world.
- Refresh Rate**
  - A higher refresh rate means images are updated more frequently, minimizing the discrepancy between head movements and display updates, reducing motion sickness, enhancing sense of presence, realism, and comfort.
  - Ranges between 75 Hz to 120 Hz for VR.
- Display Resolution**
  - The higher the pixel density, the better the display resolution, improving gaming performance, and reducing motion sickness and eye strain.

### 2. VR SELECTION

- Age appropriate
- Content suitable
- Comfort and safety equipment.
- Accessibility
- Educational value
- VR interactive
- Ease of use of equipment
- Positive impact

### DISCOVER VR

ENJOY YOURSELF BY ENTERING IN A VIRTUAL WORLD!

### 3. HARDWARE

- Understand the components of VR
- Identify elements of hardware and software
- improve quality of VR experience
- Refer to the Virtual Reality Hardware Guide for more information.

Max is the best quarterback in eleventh grade.

Get out.

He would always lead his team to victory.

The medical team was able to reposition Max' bone and put his leg in a cast.

Two weeks later: In the waiting room.

The doctor told Max that they needed to reposition his bone, then put his leg in a cast.

... Is it going to hurt?

Max but and for

Oh man... I hate needles.

If you'd like, you can try virtual reality, it will help distract you.

This procedure will cause you some pain, the nurse will give you some medication through an IV. It will relieve your pain.

Max put on this VR headset and entered an imaginary football field that looked real!

WOAH... this is so cool!



Shriner's Hospitals for Children® Canada



# VR Workshop: Program

9:00 AM

Booths & Posters

## VR MARKET, PRODUCTS, AND RESEARCH

Booth and poster set up and viewing

Welcome & Opening Remarks

9:30 AM

### OPENING REMARKS

*Kelly Thorstad, MSc(A)N PHCNP*, Nurse Executive, Shriners Hospitals for Children®-Canada  
*Reggie Hamdy, MD FRCSC*, Orthopedic Surgeon, Shriners Hospitals for Children®-Canada

9:40 AM

Readiness for VR Adoption

## THE BARRIERS, FACILITATORS, AND CONTEXTUAL CHALLENGES OF VR USE

*Argerie Tsimicalis, RN PhD*, Associate Professor, Ingram School of Nursing, McGill University

Overview of VR use in Child Healthcare

10:00 AM

### EVIDENCE FOR VR PAIN MANAGEMENT

*Sylvie Le May, RN PhD*, Professor, Faculty of Nursing, Université de Montréal

10:30 AM

Lessons Learned

## LESSONS LEARNED FROM FIVE STUDIES ON VR AND CHILDREN: FROM MOTIVATION TOWARD TREATMENT TO BIOFEEDBACK FOR MIGRAINE

*Stéphane Bouchard, PhD*, Psychoeducation and Psychology Department, University of Québec in Outaouais

Booths & Posters

11:00 AM

## VR MARKET, PRODUCTS, AND RESEARCH

Various companies, researchers, clinicians, and trainees.



12:00PM

Lunch & Discussion Tables

## INTEREST GROUP DISCUSSIONS



Implementation of VR

1:00 PM

## CREATING A PLAN TO INTEGRATE VR INTO YOUR PRACTICE SETTING

*Guillaume Fontaine, RN PhD*, Assistant Professor, Ingram School of Nursing, McGill University

3:00PM

Closing Remarks

### CLOSING REMARKS

*Argerie Tsimicalis, RN PhD*, Associate Professor, Ingram School of Nursing, McGill University  
*Jacqueline Chow, RN, Patient Partner, BNI Student (U2)*, Ingram School of Nursing, McGill University



# CALL FOR ABSTRACTS

DEADLINE: 2 APRIL, 2024

The McGill Virtual Reality for Child Care hub is hosting its first, in-day VR workshop event. It is an opportunity for all healthcare professionals, researchers, and trainees across Québec to come together and learn evidence for VR in pain/anxiety management, meet with VR companies, out their products, and draft a mobilization/implementation to integrate their respective practice settings.

The VR Workshop Organizing Committee invites all students, researchers, and healthcare professionals to submit an abstract for a poster/booth session of the workshop.

# CALL FOR BOOTHS

DEADLINE: 17 APRIL, 2024



# VR Workshop: Program

9:00 AM

Booths & Posters

## VR MARKET, PRODUCTS, AND RESEARCH

Booth and poster set up and viewing

Welcome & Opening Remarks

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### OPENING REMARKS

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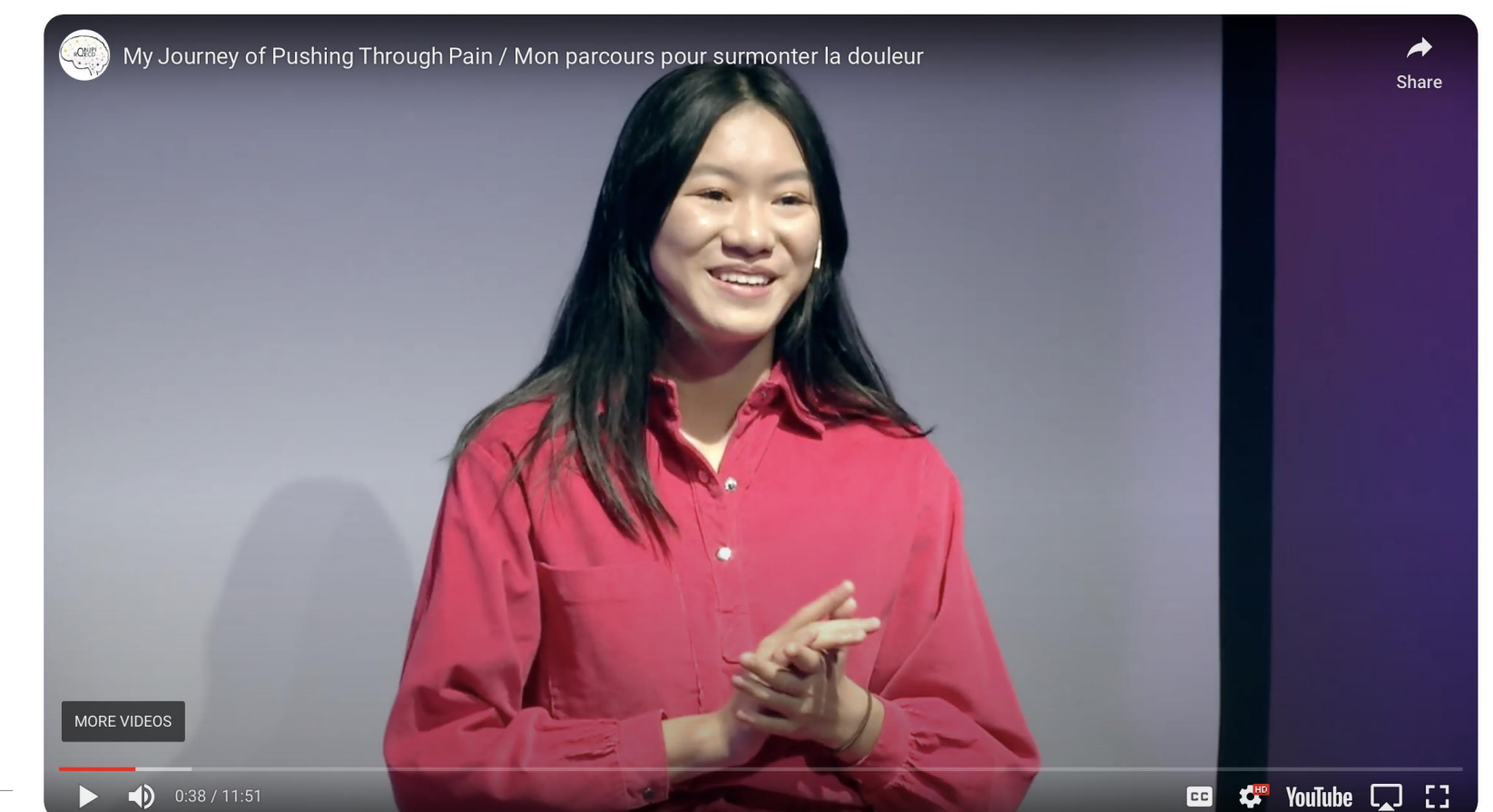
Canada



## My Journey of Pushing Through Pain / Mon parcours pour ...

YouTube · RQECD-QNUPI PAINtalks · Jan 17, 2022

YouTube





# METHODS

- We are conducting an organizational participatory research design guided by the Knowledge-to-Action Framework.

## ASSESS READINESS

Online, ADOPT-VR2 survey to healthcare professionals across Québec to assess determinants of prospective take-up of VR.



## DEVELOPING RESOURCES

Based on survey and workshop, we will co-develop KM resources to support VR dissemination and use. Resources are published on the VRCC website.

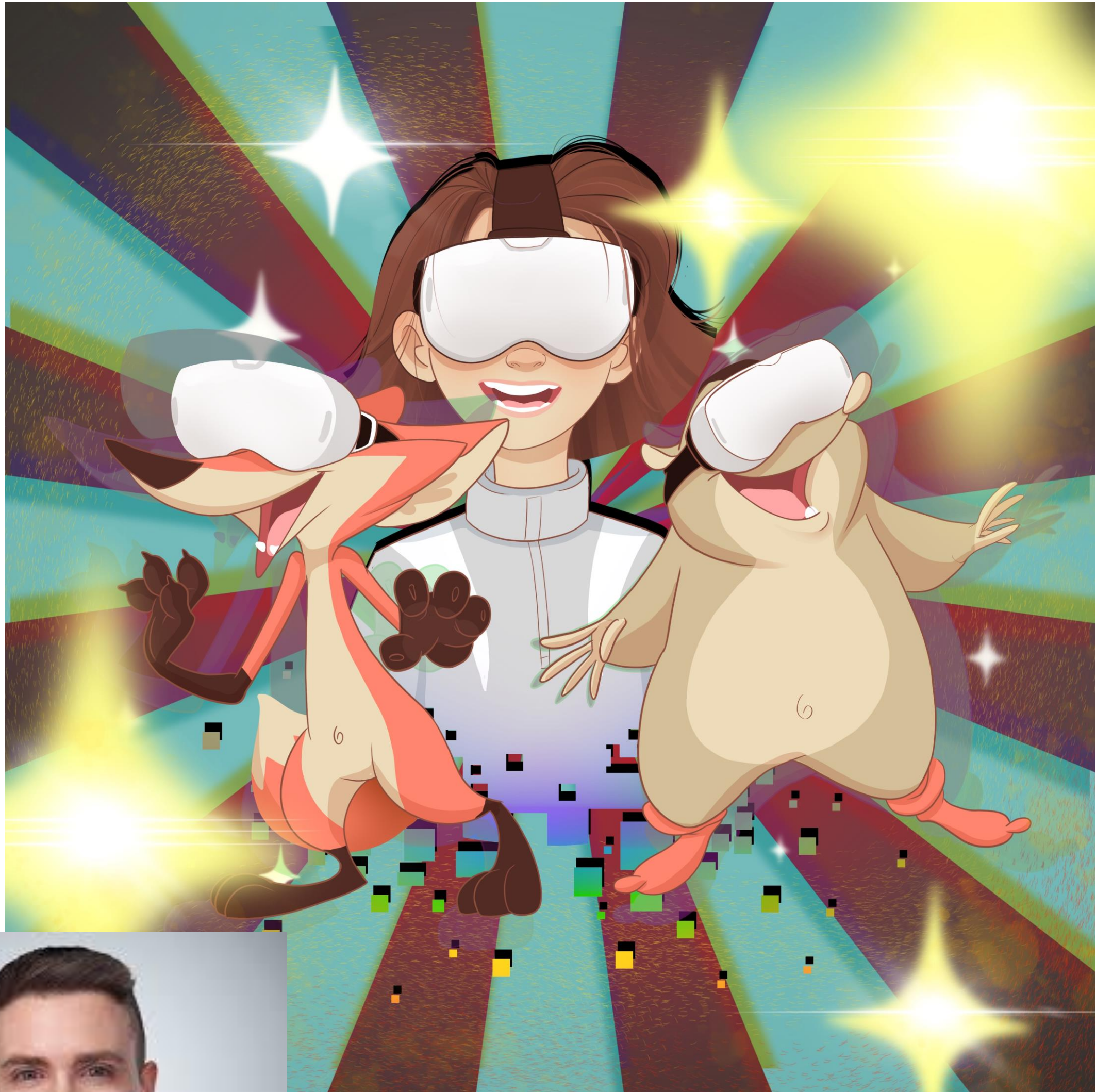


## TRAINING

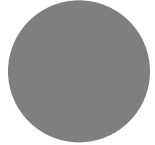
Based on survey feedback, we will host a workshop to train healthcare professionals in VR use, targeting specific barriers and contextual challenges.







Share your implementation plans (of any stage of thinking, drafting)





# ChildKind International

ChildKind International is a nonprofit organization whose mission is to improve the quality of pediatric pain care around the world through:

- Encouraging excellence in pain care by supporting and recognizing institutions that have developed best practices
- Expanding pain management knowledge with an open exchange of best practices and protocols in the prevention and treatment of pain
- Building connections among clinicians by providing ongoing educational forums

With support from ChildKind, healthcare organizations can enhance their pain management practices to help children at their most vulnerable time.



0 SEARCH RESULTS FOUND FOR: "VIRTUAL REALITY"



Facility: CANADA		
Department \ Service name: NURSING AND PATIENT CARE SERVICES		
Virtual Reality for Procedural Pain and Anxiety Management		
<input type="checkbox"/> Policy <input type="checkbox"/> Procedure <input checked="" type="checkbox"/> Policy and procedure <input type="checkbox"/> Protocol	<input type="checkbox"/> Guidelines <input type="checkbox"/> Collective order <input type="checkbox"/> Manual	<input type="checkbox"/> Plan <input type="checkbox"/> Form <input type="checkbox"/> Annex
Document No:		



# The first national Pediatric Pain Management standard

Solutions for Kids in Pain (SKIP) and the Health Standards Organization (HSO) are pleased to announce Canada's first national Pediatric Pain Management standard, establishing a set of guidelines for the delivery of pain management for children from birth to 19 years. The standard provides guidance to health care organizations on how to deliver equitable and quality pain management across hospital settings!

#ItDoesntHaveToHurt

News Release

Executive Summary

Download now

- home
- about us ▾
- our team ▾
- resources
- our activities ▾
- our impact
- connect ▾

Language / Langue ▾

Topic / Thèmes ▾

Type of Resource / Type de ressource ▾

**Preparing your kids for the COVID-19 Vaccine: What Parents Need to Know.**

live discussion hosted by Erica Ehm with Catherine Smart, Dr. Christine Chambers and Dr. Deb Balino, to have your questions answered about the COVID-19 vaccine for kids.

**PREPARING YOUR KIDS FOR THE COVID-19 VACCINE: WHAT PARENTS NEED TO KNOW**

**FACT vs. FICTION**

Join Dr. Christine Chambers, Dr. Tim Caulfield and Jack Hourigan live. Hosted by Erica Ehm.

**TUNE IN NOW**

**Prise en charge de la douleur procédurale chez les enfants et les jeunes : trousse d'outils pour le personnel de la santé**

kidsinpain.ca/skip-resources

**Procedural pain management in children & youth: A toolkit for health professionals**

kidsinpain.ca/skip-resources

**Vers une vaccination équitable : Un examen sommaire de facteurs**

**Steps towards equitable vaccination: A rapid review of factors to support**

**Needle Pain & Anxiety Management for Vaccination Under 5**

Resources for Children Under 5 Years Old

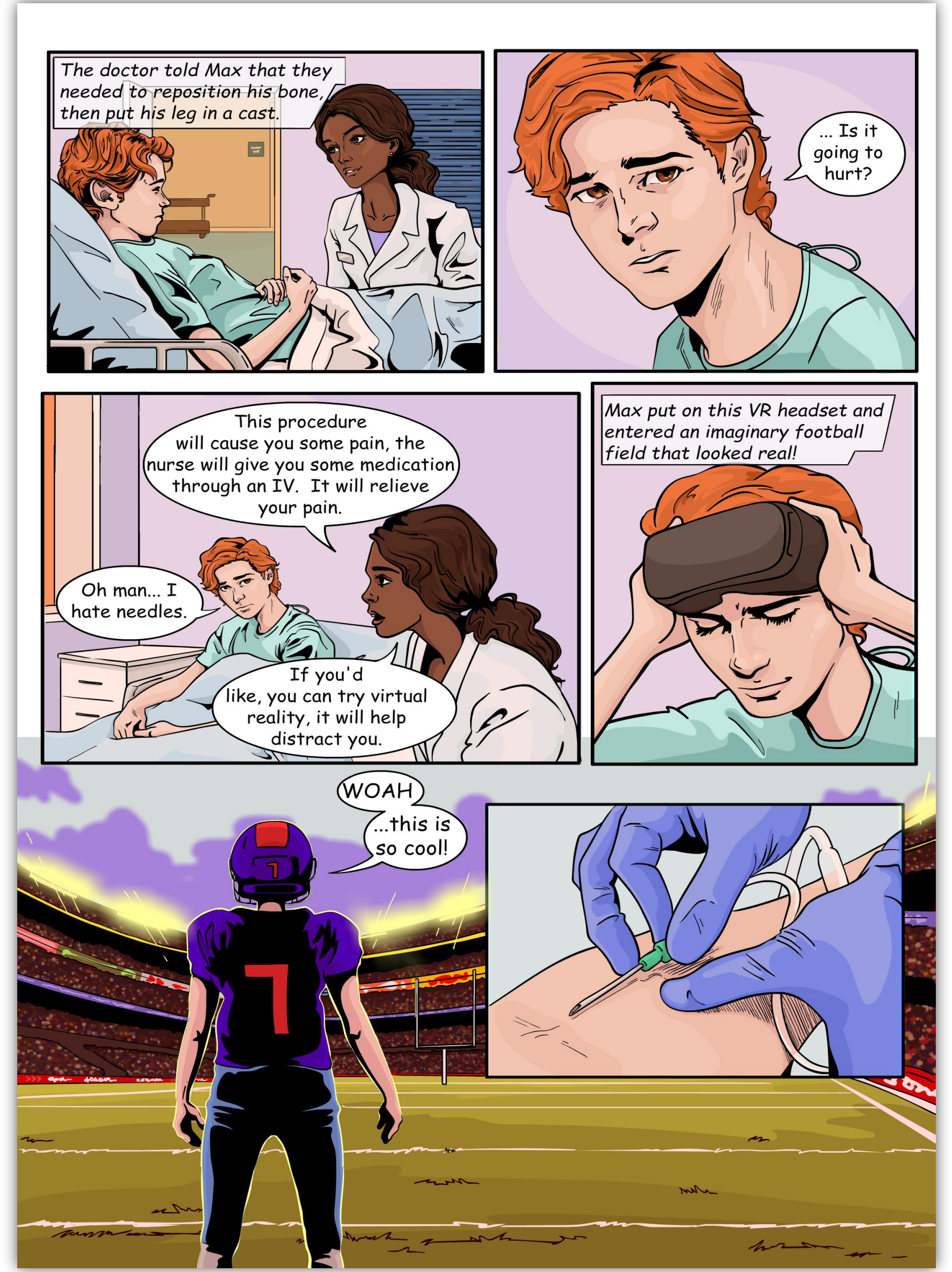
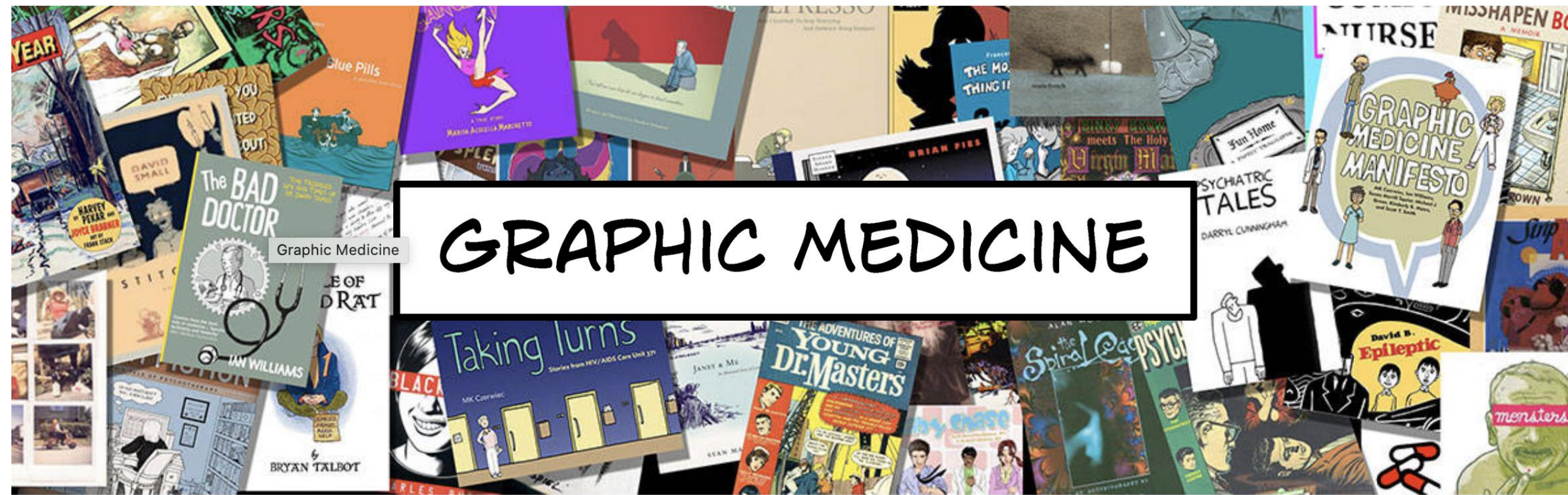
**Alors, nous traitons la douleur des enfants**

Évaluer et documenter la douleur



# CALL FOR COMIC STRIPS

Join us in creating a comic book

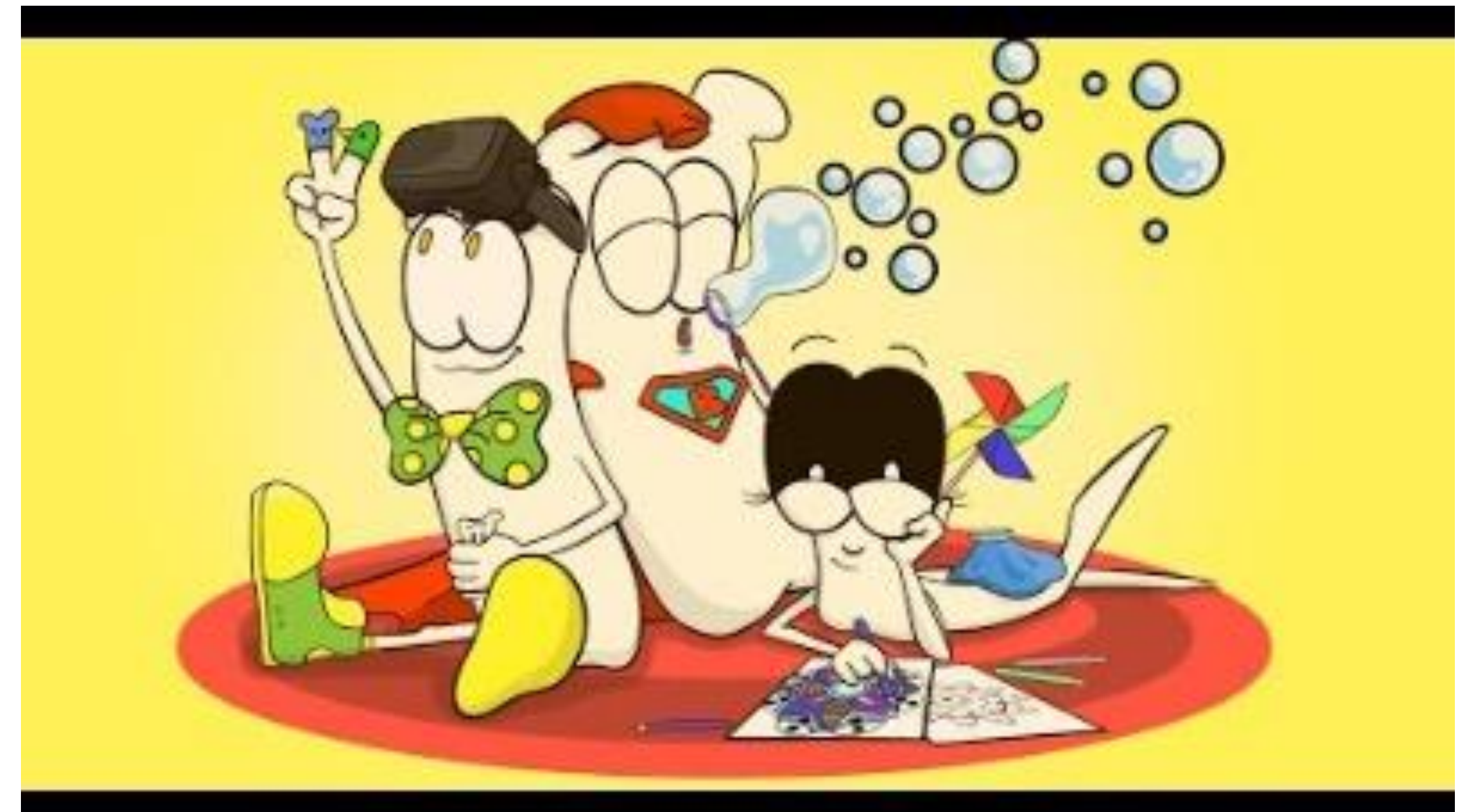
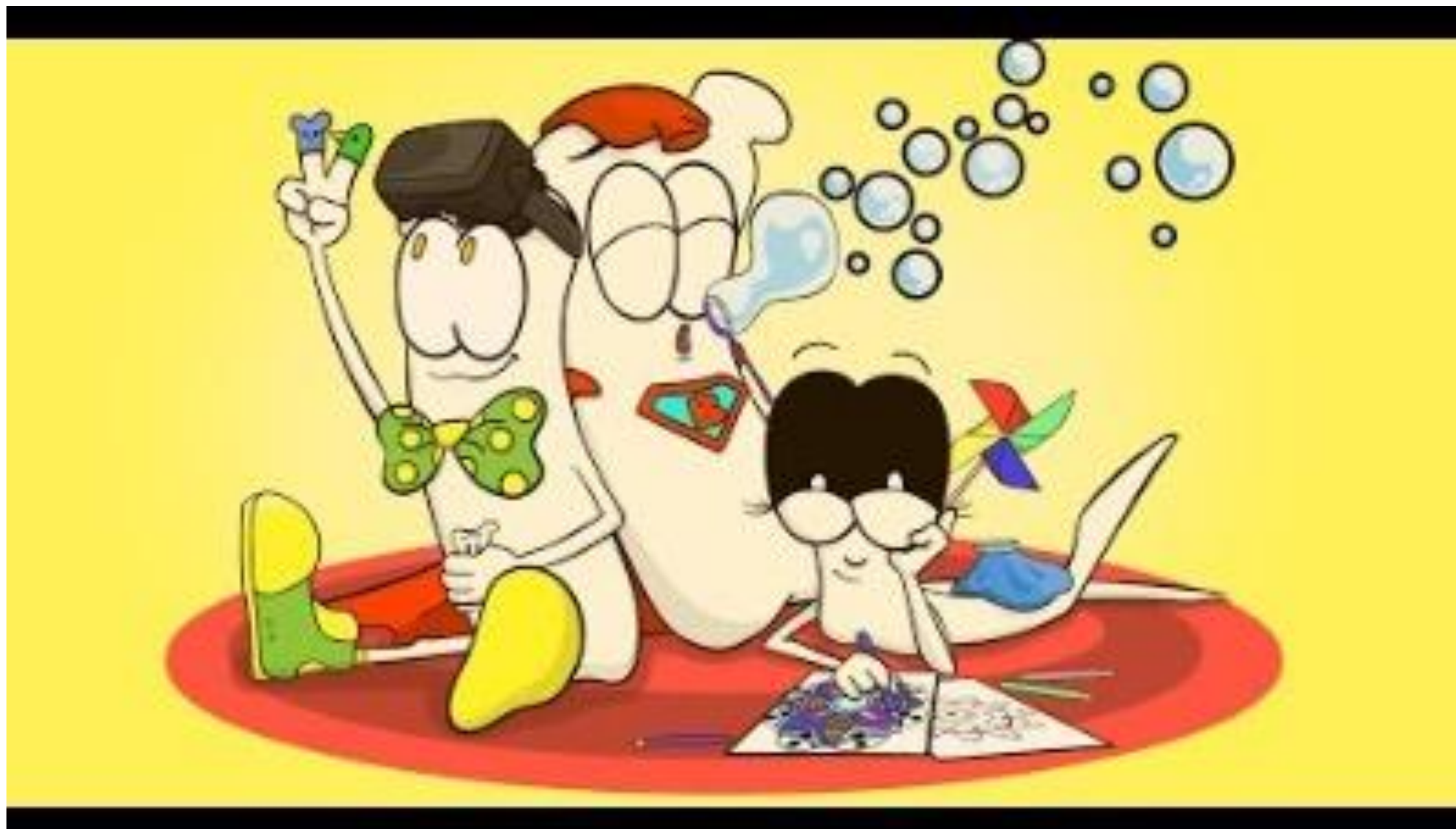


## MONTREAL COMIC ARTS FESTIVAL



# What Can We Do When Feeling Pain

Lorsque tu ressens de la douleur



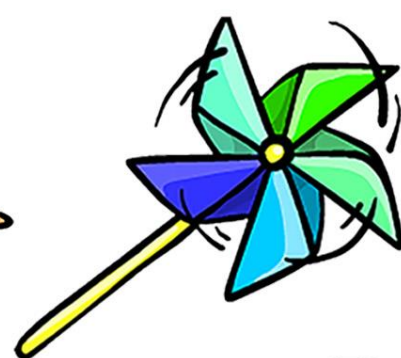
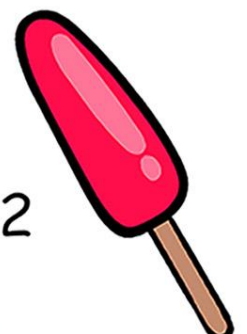
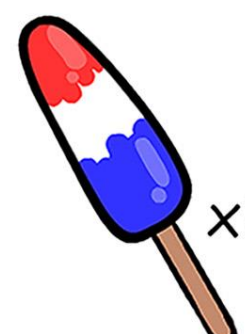
**Hôpitaux Shriners**  
pour enfants®  
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