

# Pediatric Vaccine Hesitancy in British Columbia

A systematic analysis of COVID-19 vaccine uptake amongst eligible pediatric populations in British Columbia



Paniz Ataei  
Rachel Kehler  
Nima Toussi  
Emilie Wang

Roughly **1 in 10** children experience lingering **COVID symptoms**  
**6 weeks** after a positive diagnosis

Over **180,000** children aged 5-17 in **British Columbia** are  
**unvaccinated** against COVID-19

Students affected by COVID-related **school closures** can  
expect **3% lower income over their lifetime**, with this  
effect especially pronounced in disadvantaged students

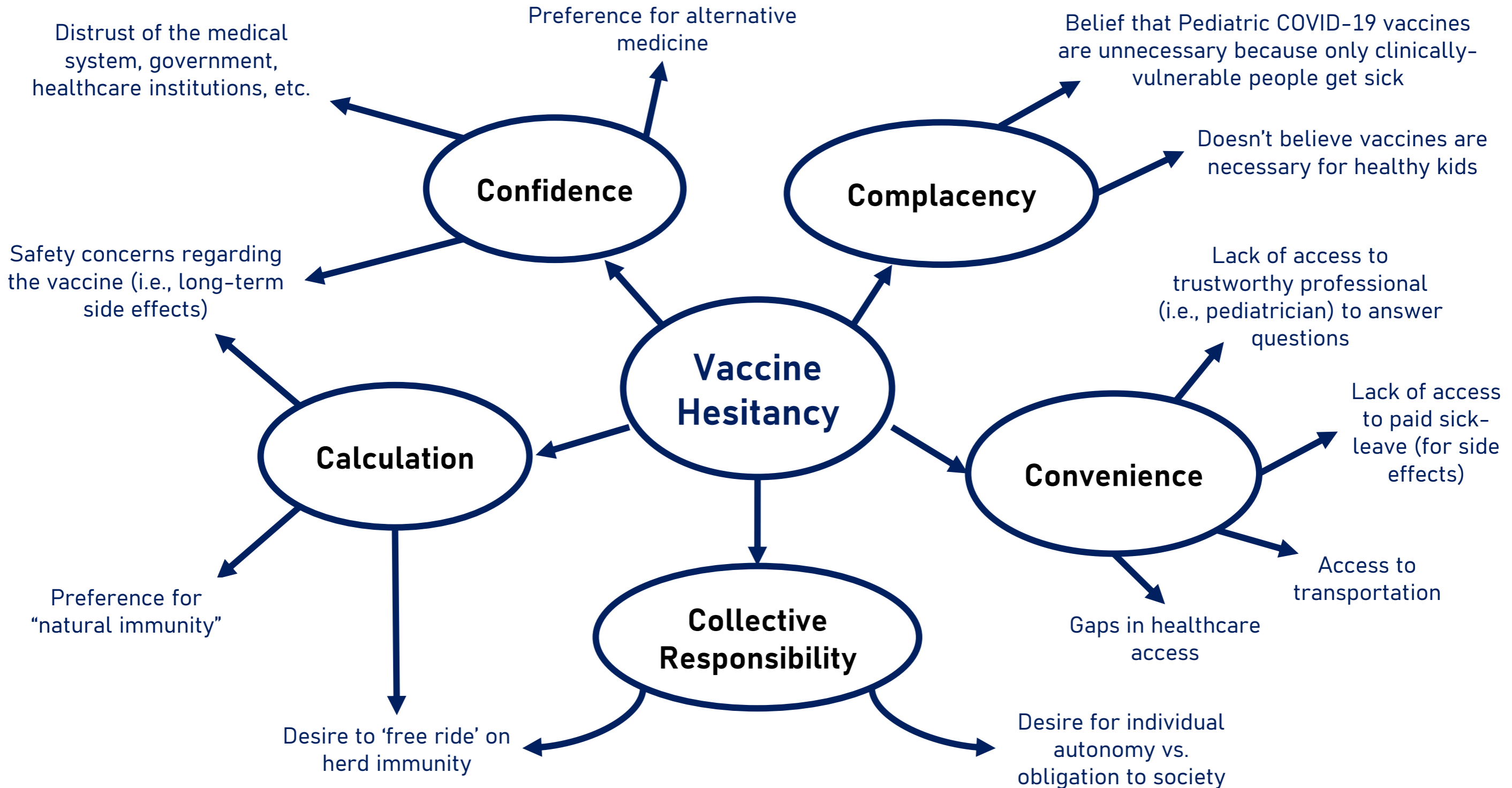
**\$1 Billion** additional dollars spent on healthcare owing to  
**lack of community immunity** from COVID-19





# How do Parents make Choices about Vaccines?

The 5C's represent the five individual assessments each decision-maker undertakes when making choices regarding vaccines.

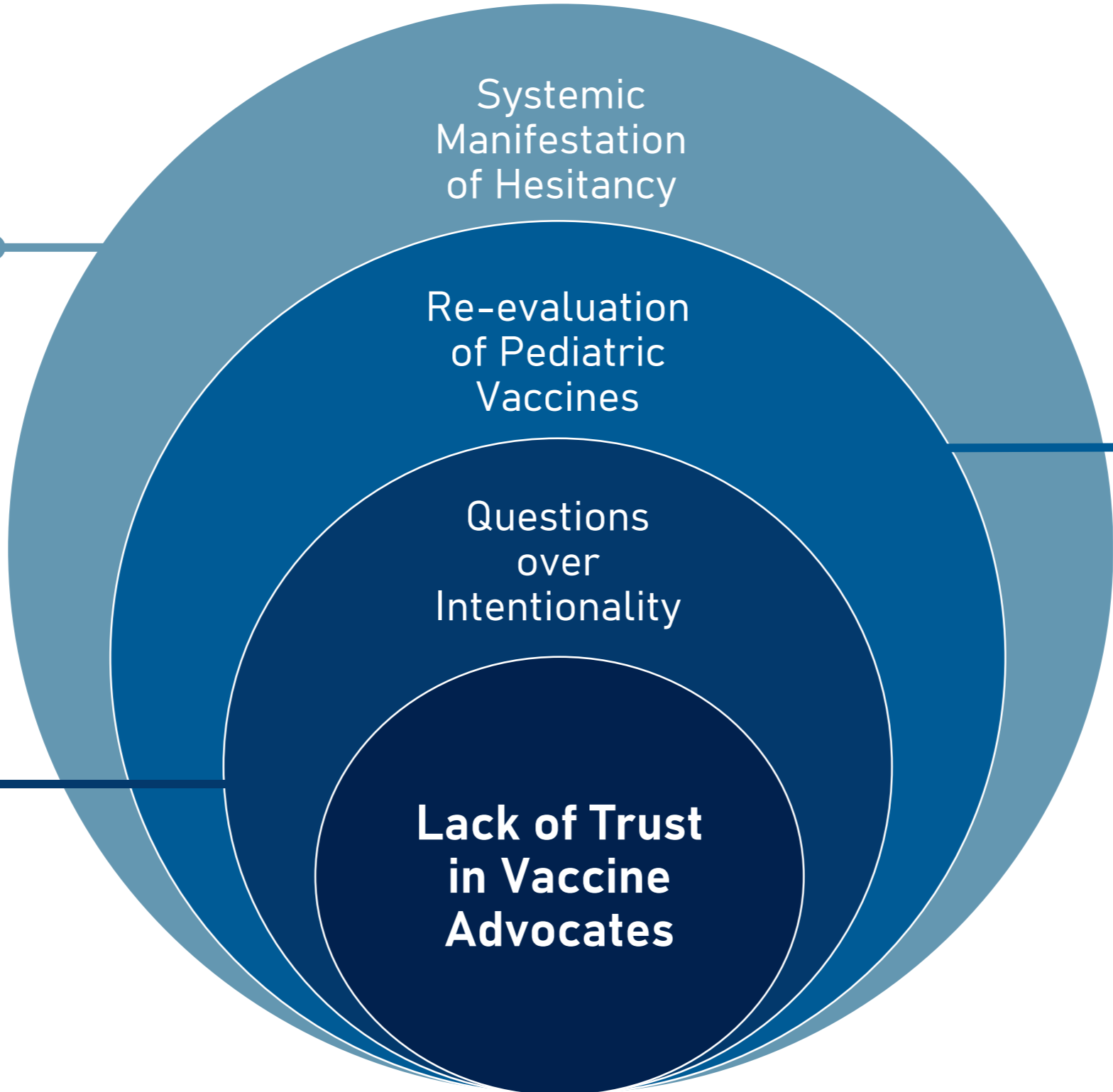


# Lack of Trust is at the Core of Systemic Causes of Vaccine Hesitancy

Popular agents of vaccine hesitancy do not develop on their own, lack of trust in vaccine advocates is at the core of commonly-cited causes of vaccine hesitancy

Systemic promoters of vaccine hesitancy, such as **misinformation, politicization, and social alienation** arise after the **parent places trust in “anti-vaccination” stakeholders**. These **systemic factors** influence **individual assessments** of vaccines, i.e., the **5Cs**

If a lack of trust develops in vaccine advocates, **hesitant parents may question the intentions and motivation of vaccine advocates**, which enables the next steps in hesitancy



If parents negatively evaluating the intentions of vaccine advocates, they may **re-evaluate their position** on vaccines by **seeking new stakeholders to trust**, such as **community groups, social media influencers, “maverick scientists” and/or political groups**

# Why does Pediatric Vaccine Hesitancy Exist and Persist?

A lack of trust in vaccine-advocate stakeholders is entrenched by mental models which parents and stakeholders exhibit. Surface-level causes of vaccine hesitancy are underpinned by these mental models

As breakthrough infections occur, public **confidence diminishes** in vaccine **efficacy**

Infection of clinically-vulnerable individuals who rely on **herd immunity** to be protected

**Socioeconomic unease** due to the pandemic is evaluated differently by different social/political groups, causing **public discontent**

Incidents of **discrimination** against **disadvantaged populations** persist in healthcare and research

Perceived **profit-motivated behavior** of **'Big Pharma'** creates doubt over their intentions/effectiveness of the vaccine

The **public underappreciates** the **'herd immunity'** role of vaccination, understands vaccination on an individual level

**Patterns of Behaviour**

**Alternative Media Influencers** leverage social discontent to spread **misinformation** at a historic rate

Calls to action regarding **diversity and inclusion** are **inadequately implemented** in research and healthcare

Governmental stakeholders lack **self-regulatory mechanisms** to enforce transparency, don't address public interest in 'Big Pharma' relationship

Public Health Officials communicate vaccination as an **individual decision**, rather than a **collective obligation**

**Systemic Structures**

**Profit-driven media** promotes narratives to **attract niche audiences**. Social groups listen to different news sources, fermenting social division

**Healthcare and Research** institutions operate as a **"gated communities"**, limiting public interaction and inquiry

**Non-transparency** of government/'Big Pharma' relationship promotes doubt in governments' intentions regarding vaccines

Parents are enabled to make **individualistic choices**, conduct their **own research** into if vaccination is right for their child

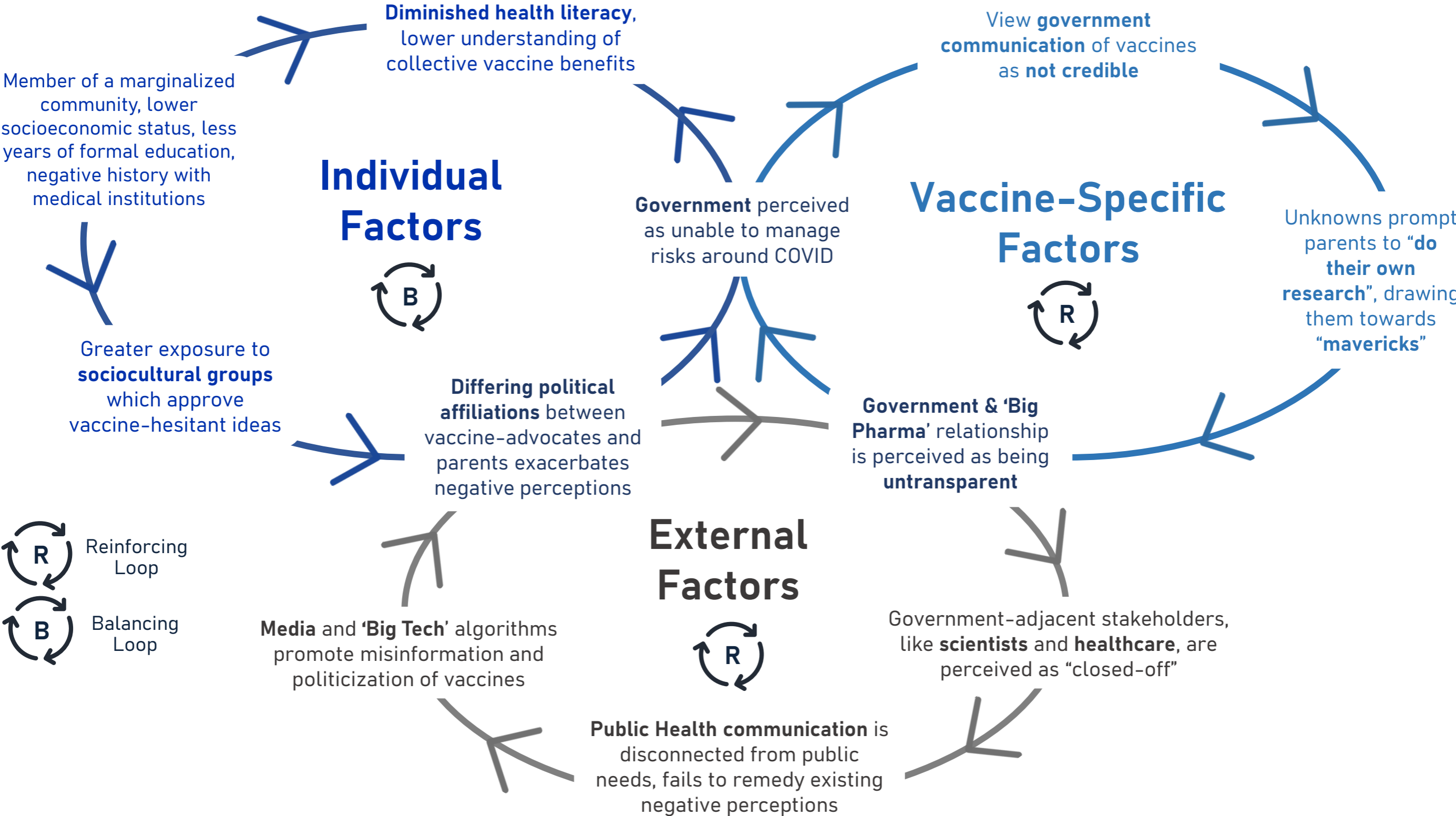
**Mental Models**

When **experts** cannot **manage the risks** around COVID, parents take greater agency in selecting sources of trustworthy information

Physicians, researchers and policy-makers believe they must **educate** a misinformed, stubborn **public**

# Root Causes of Pediatric Vaccine Hesitancy as Interconnected Cycles

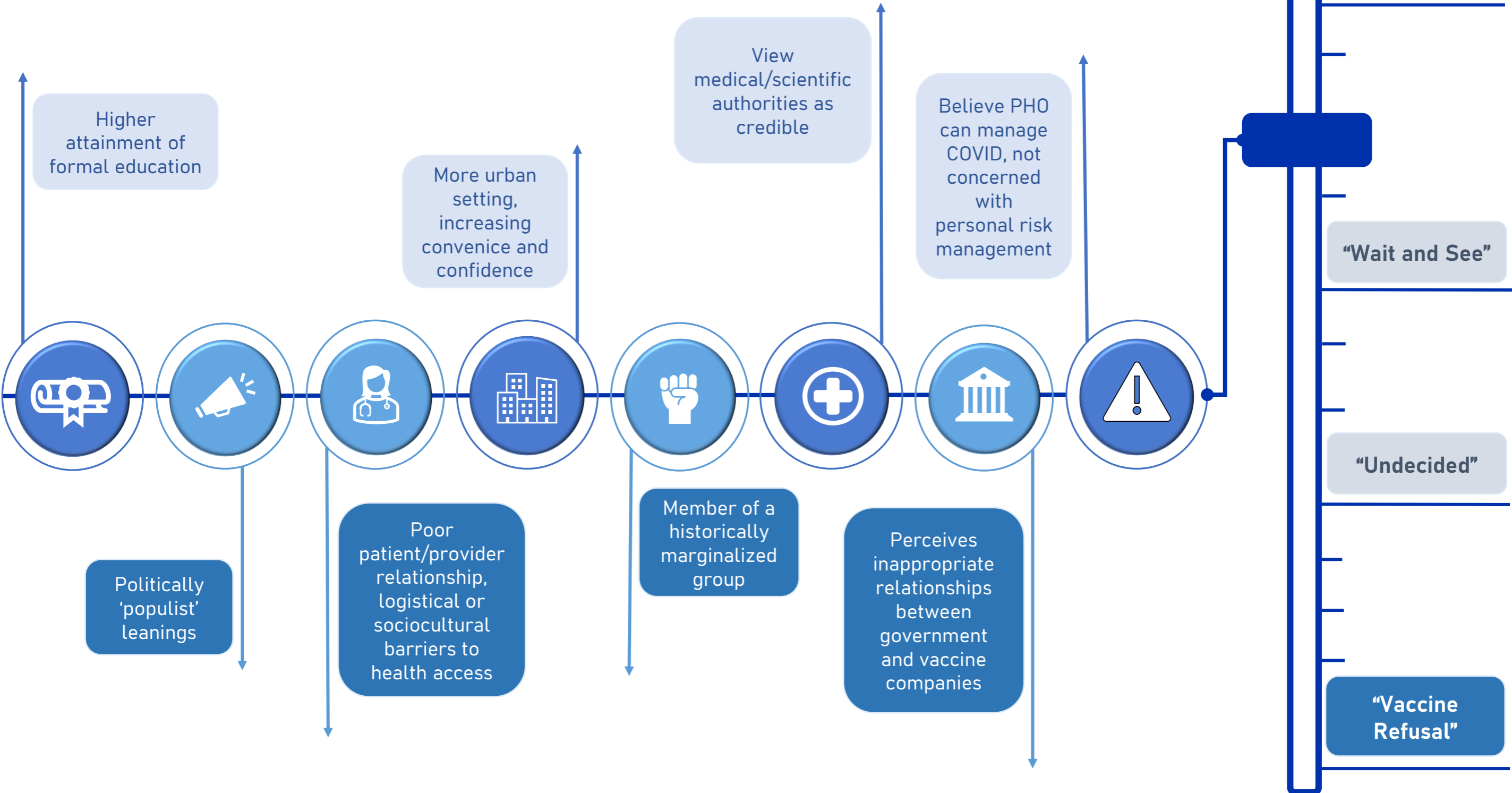
Three interconnected factors - individual, vaccine-specific, and external - create interconnected cycles which manifest the root causes of vaccine hesitancy





# Spectrum of Vaccine Hesitancy/Acceptance

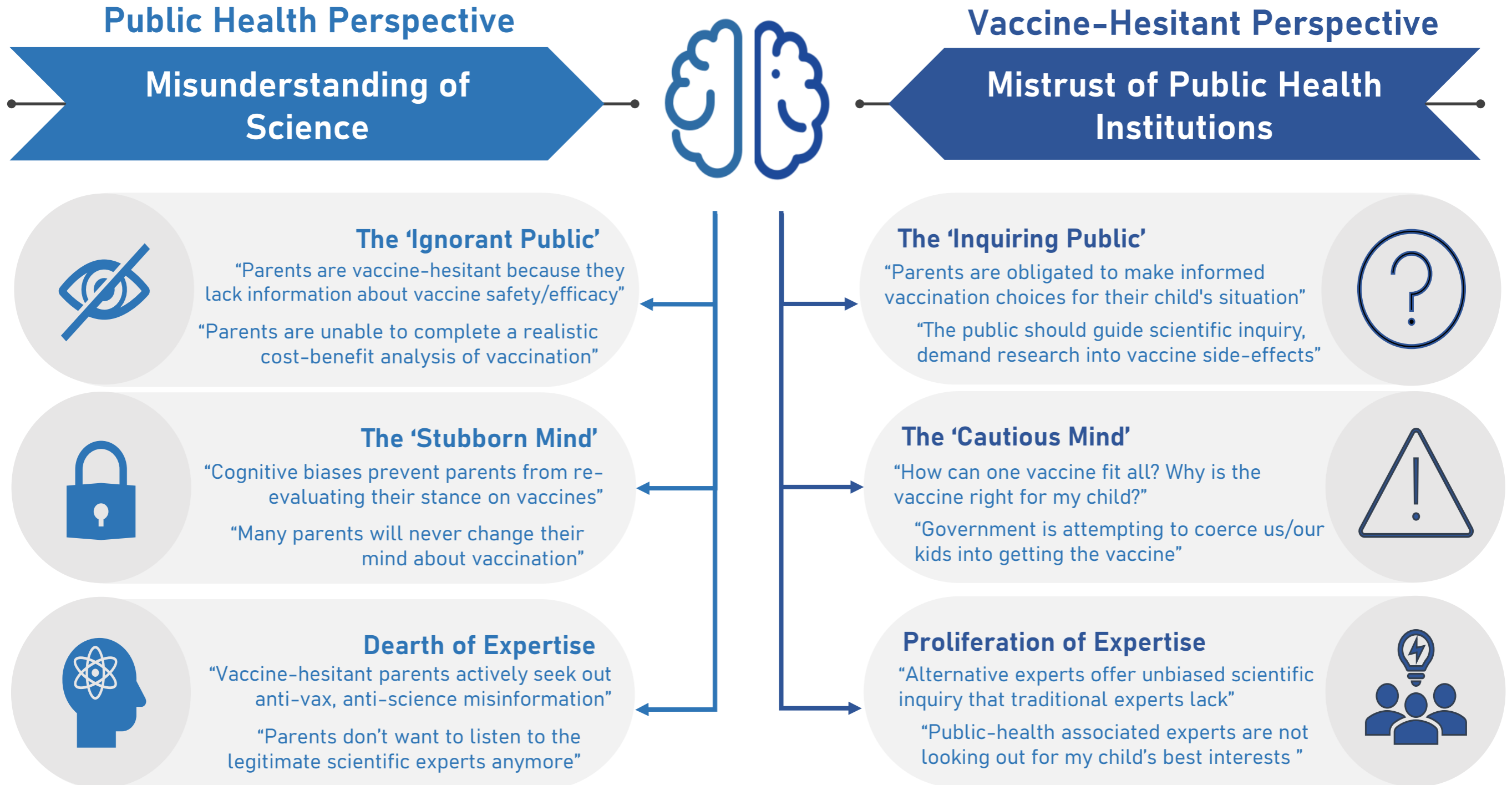
Individual attitudes towards pediatric vaccines are influenced by a spectrum of factors related to personal demographics, attitudes and social contexts



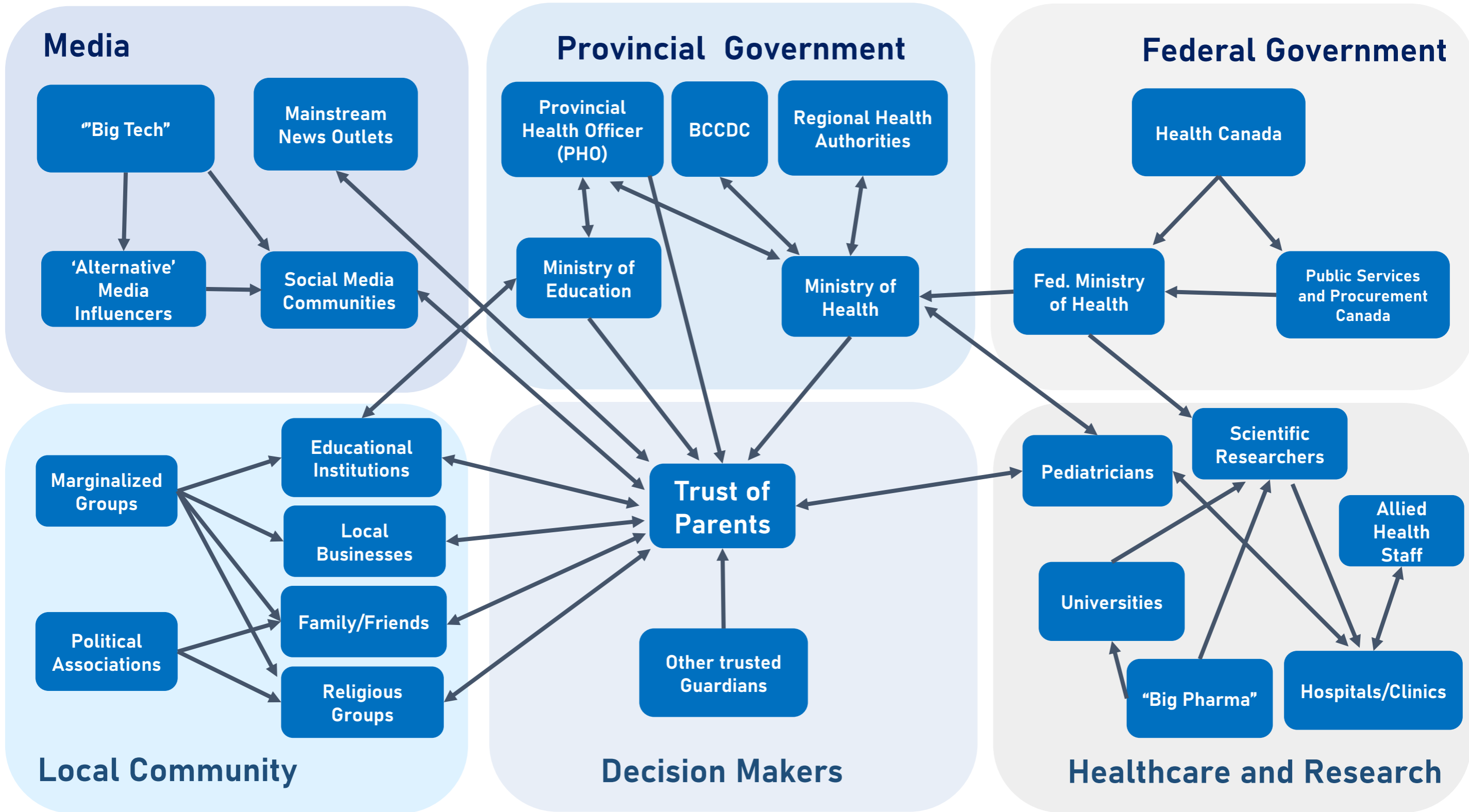


# Duelling Interpretations – Themes of Vaccine Hesitancy

Many historical themes of Pediatric Vaccine Hesitancy, and their competing perspectives, have been central to the creating the current challenge landscape regarding COVID-19 pediatric vaccine hesitancy



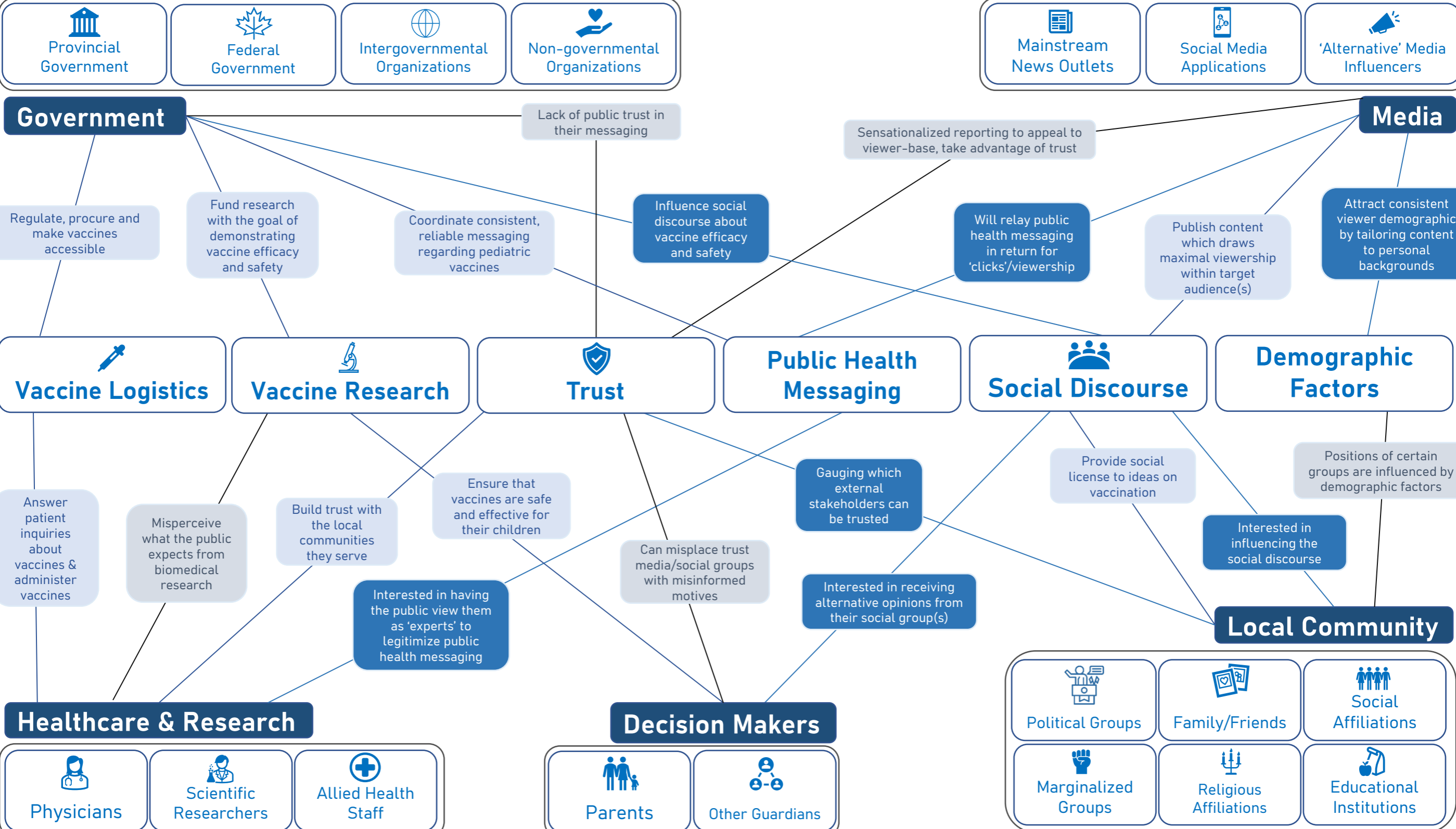
# Who are the Stakeholders in Pediatric Vaccine Hesitancy?



# Stakeholder – Variable Interactions

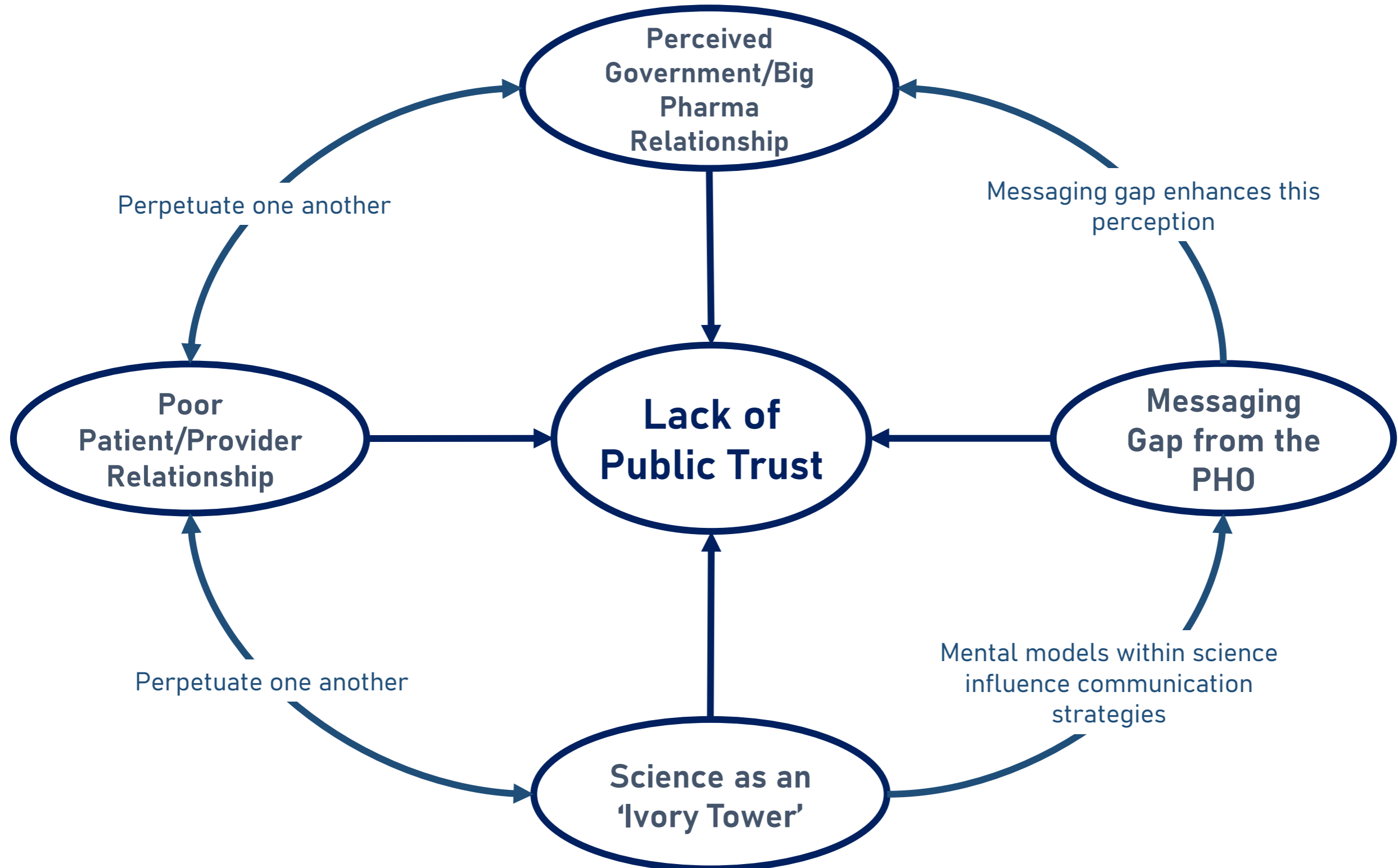
How stakeholder groups are affecting, or are affected by, the key variables contributing to vaccine hesitancy

- Roles
- Goals/Interests
- Gaps/Limitations



# What makes up the Challenge Landscape?

Historical systemic structures and mental models established by key macro-level stakeholders make up the challenge landscape



# Two Sides to the Scientist – The Expert and The Maverick

When scientific figures are demoted by the public due to a lack of trust and confidence, a scientific ‘antihero’ – the Maverick, is advanced in place of traditional scientific figures. The ‘Maverick’ is a reconfiguration of the status-quo scientist during trust/confidence crises in science

**Examples: Drs. Theresa Tam, Bonnie Henry, and Anthony Fauci**

**Examples: Drs. Andrew Wakefield, Michael Yeadon, and Barry Marshall; Galileo and William Harvey**

Public concern is dismissed as unrealistic and uninformed, reinforcing public sentiment that science is an elitist institution

Attempt to counter public concern by insisting on the illegitimacy of alternative “science”

Scientists govern themselves on an internal set of norms, such as organized skepticism, financial disinterestedness, and universalism of procedure

Credibility decreases significantly when they are unable to guide public through societal risks



Public Concern is a missed opportunity for mass engagement, capitalize on public unease

Challenge the integrity of “establishment” research and introduce questions of privilege regarding scientific discourse

Take advantages of missing norms in science governance – such as representation and public service – and violations of norms – such as industry partnerships – to progress an ‘anti-science’ agenda

Sanctions against Mavericks by the scientific community are perceived as self-preserving actions by the ‘establishment’

# Levels of Solutions

An overview of attempted solutions at **organizational**, **provincial**, **federal**, and **international** levels

**UBC ImmPACC:** A workshop facilitated by the UBC Faculty of Medicine, where local stakeholders work with public health experts to discuss and design customized solutions to address community-specific immunization barriers

**Vaccine Logistics:** BC allows children to receive their vaccination during their parent's appointment, easing the logistical burden of vaccination

**IMPACT:** IMPACT is a national active surveillance network for adverse vaccine events. Beyond the program's intrinsic value, it also demonstrates to parents that practitioners and policy makers care about adverse vaccine effects

**Ontario's Vaccine Education Certificate:** In 2017, Ontario introduced a mandatory vaccine education clinic for parents who sought an exemption their children. It had a "0% conversion rate" as of 2019

**Compulsory Vaccines in Chinese Schools:** Some local Chinese governments have made COVID-19 vaccination mandatory for entire families that have children in school, including the students themselves.

**19toZero:** A Canada-wide coalition of academics, economists, and public health experts whose goal is to produce public messaging that increases trust and confidence in vaccines

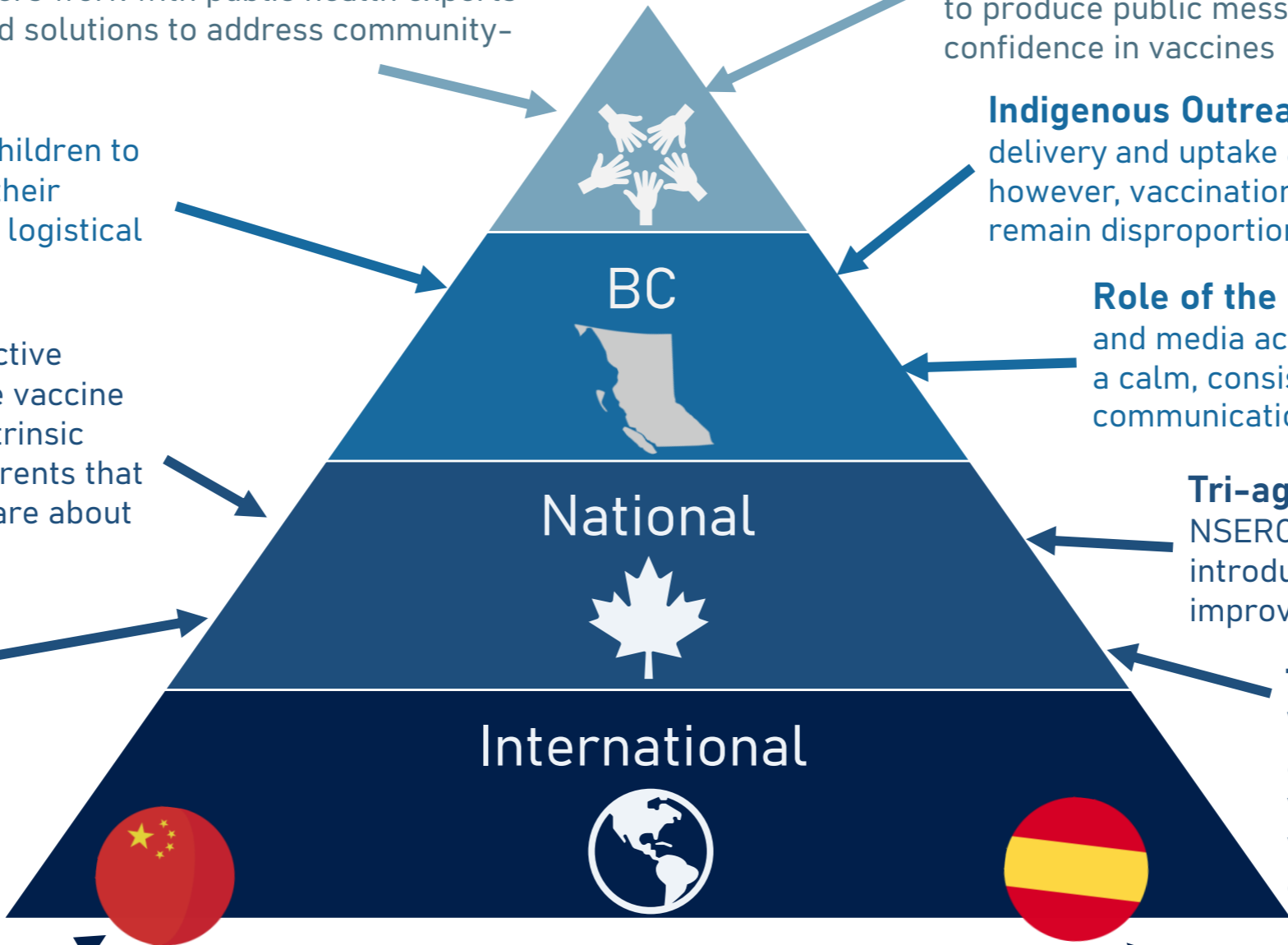
**Indigenous Outreach:** BC has prioritized vaccine delivery and uptake amongst Indigenous populations, however, vaccination rates amongst Indigenous youth remain disproportionately low

**Role of the PHO:** BC has received academic and media acclaim for Dr. Bonnie Henry's role as a calm, consistent, expert face in COVID-19 communication

**Tri-agency Research Funding:** NSERC, CIHR and SSHRC have introduced grants to fund research on improving vaccine uptake

**Travel Vaccine Mandates:** Vaccination is mandatory for all airline/rail commuters over 12 years old. Mandates can increase vaccine uptake, but may be viewed as an abuse of governmental power

**Spain's autonomous regions – Extremadura & Galicia:** Two rural, relatively impoverished Spanish provinces have bucked demographic predictors of pediatric vaccine uptake by operating vaccination campaigns within schools and threatening fines to holdouts





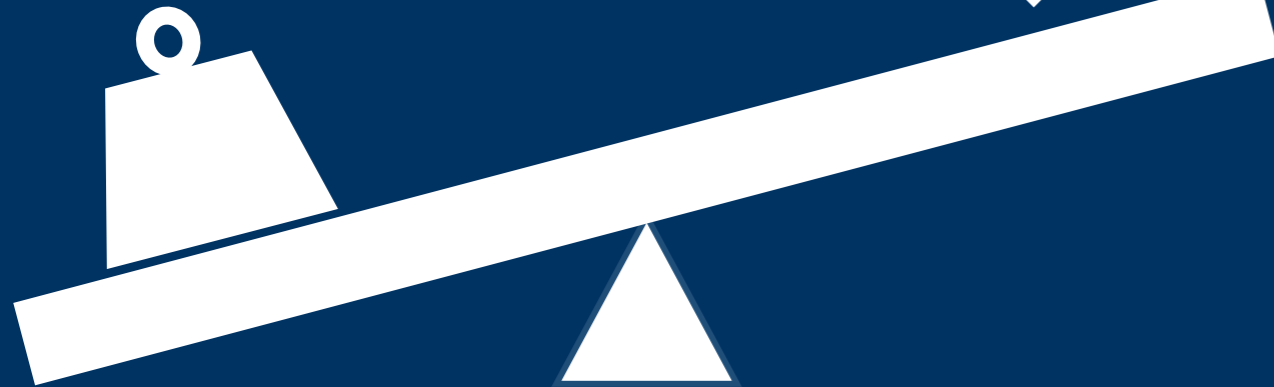
## Intervention

Implement context-relative solutions to address mistrust in medicine, focusing on disadvantaged populations



## Gap

Mistrust between patient and provider due to medical racism, inability to access providers, personal biases, etc.



## Lever

Recognize that patient's mistrust in providers stems from sociocultural and historical factors, and that this mistrust exacerbates vaccine hesitancy and access inequities

## Stakeholder Action

### Provincial Government

- Train providers in patient-oriented communication regarding pediatric COVID-19 vaccination concerns, including cultural competency training
- Increase the number of healthcare workers from underserved populations to reflect the populations that are served in BC

### Federal Government

- Allocate low-barrier funding for community organizations seeking to improve healthcare accessibility to underserved populations
- Include Indigenous and minority perspectives when developing accessibility policies and when funding research

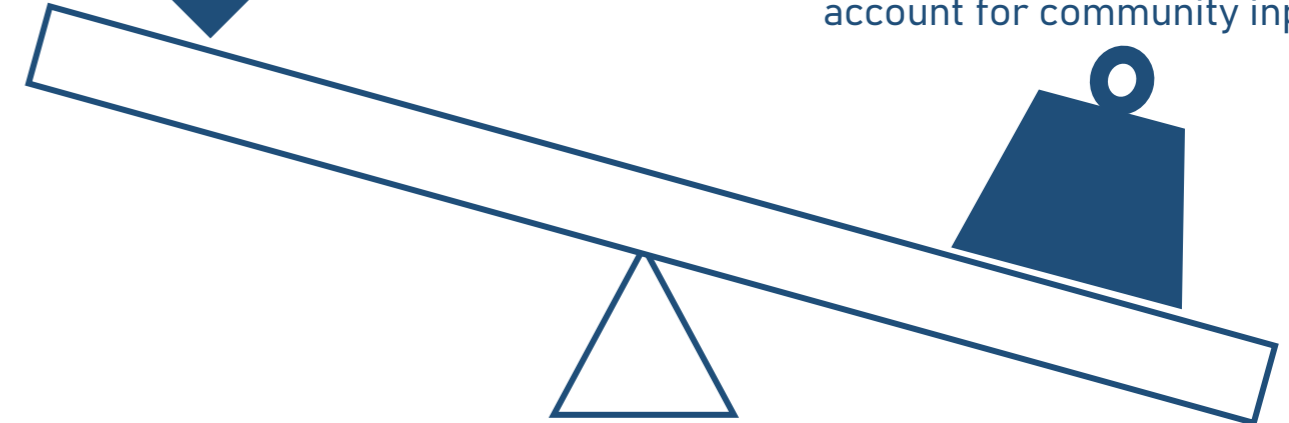
## Intervention

Design public messaging programs with public input, highlighting collective action



## Gap

Public Messaging in BC relies on 'the evidence speaks' mentality, doesn't account for community input



## Lever

Challenge assumptions regarding the framing and goals of public health messaging

## Stakeholder Action

### Provincial Government

- Recognize that misinformation, while an issue, should be understood as a 'downstream' symptom of poor public trust
- Appeal to shared values and priorities of decision-makers, rather than focusing on individual obligations of vaccine choice
- Reevaluate data-release policies with the aim of building public confidence in PHOs transparency and risk-management
- Establish transparent, easy-to-access mediums for local communities to provide feedback regarding provincial messaging

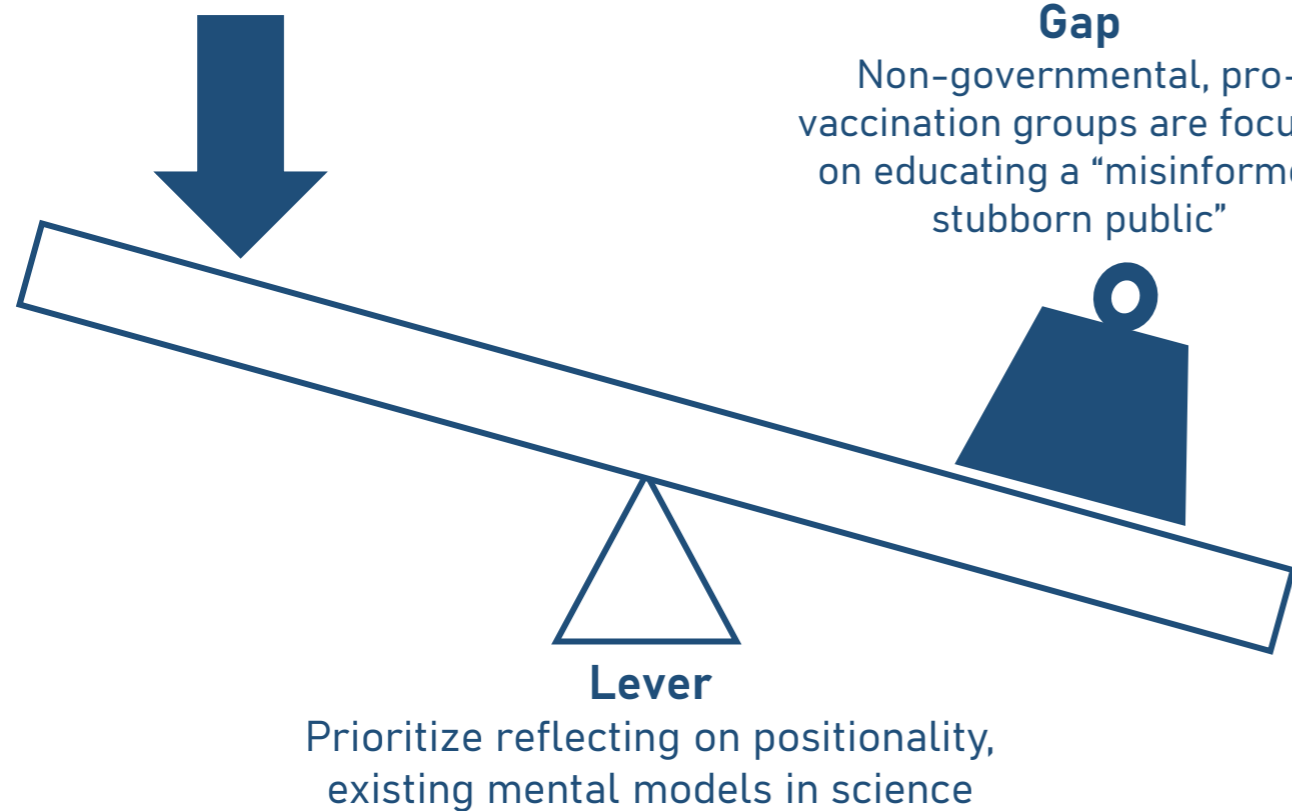
### Federal Government & Public Health Researchers

- Actively prevent the vilification of vaccine hesitant decision-makers



## Intervention

“Rebrand” science as a skeptic, universalist, and flawed endeavor, rather than an all-knowing, industrialized institution



## Stakeholder Action

### Public Health Researchers

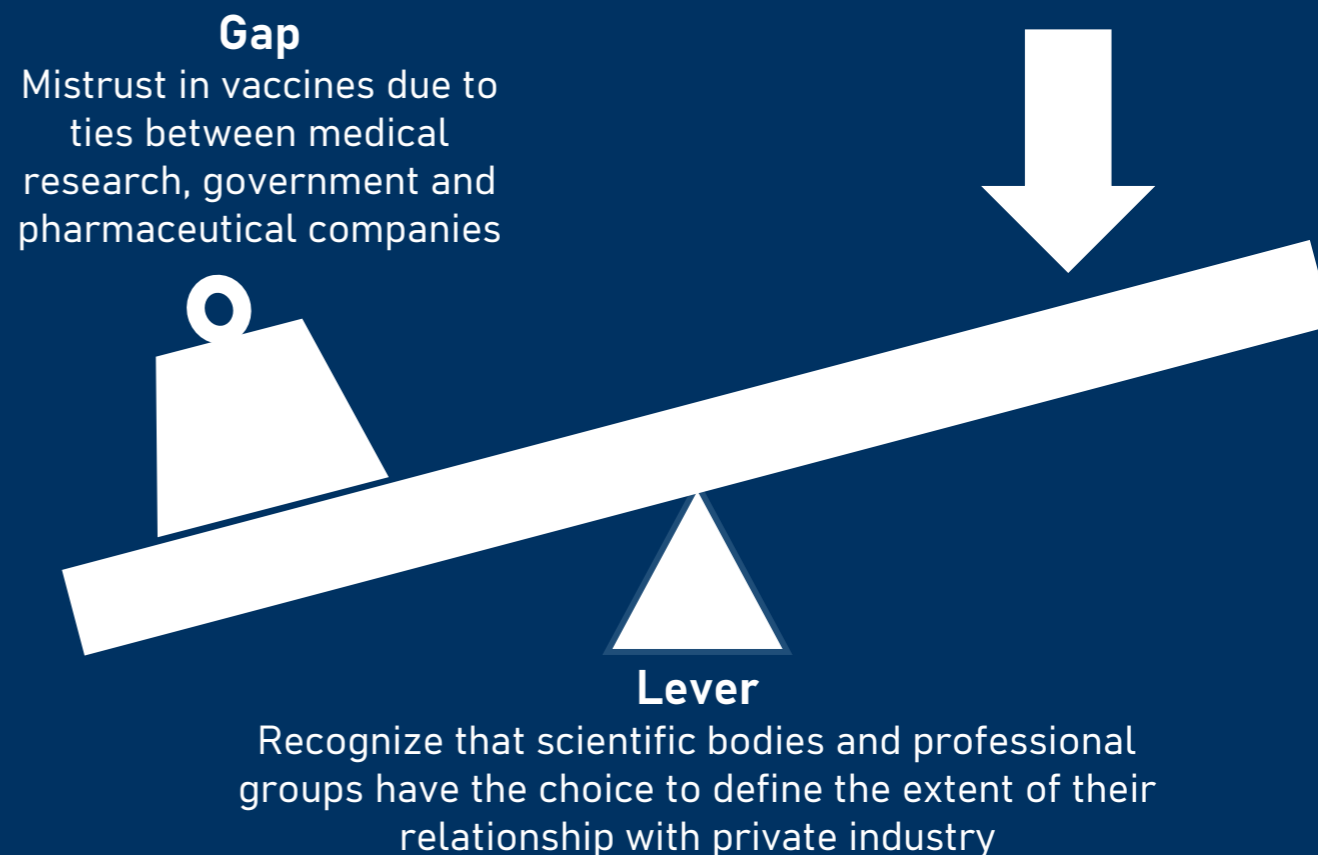
- Address “war on science” mental models within academia which pass blame for vaccine hesitancy onto the public
- Recognize that in policy-oriented science, public trust is necessary to engender collective science-based action
- Adopt open-source, open-data scientific publishing policies
- Publically acknowledge gaps in research/scientific understanding

### Local Communities & Healthcare Practitioners

- Pro-vaccination groups must cease referring to science as an absolutist sociopolitical dogma
- Validate and discuss parental concerns regarding vaccination

## Intervention

Expand current efforts to delineate relationships between government and industry, with the aim of demonstrating public transparency



## Stakeholder Action

### Federal Government

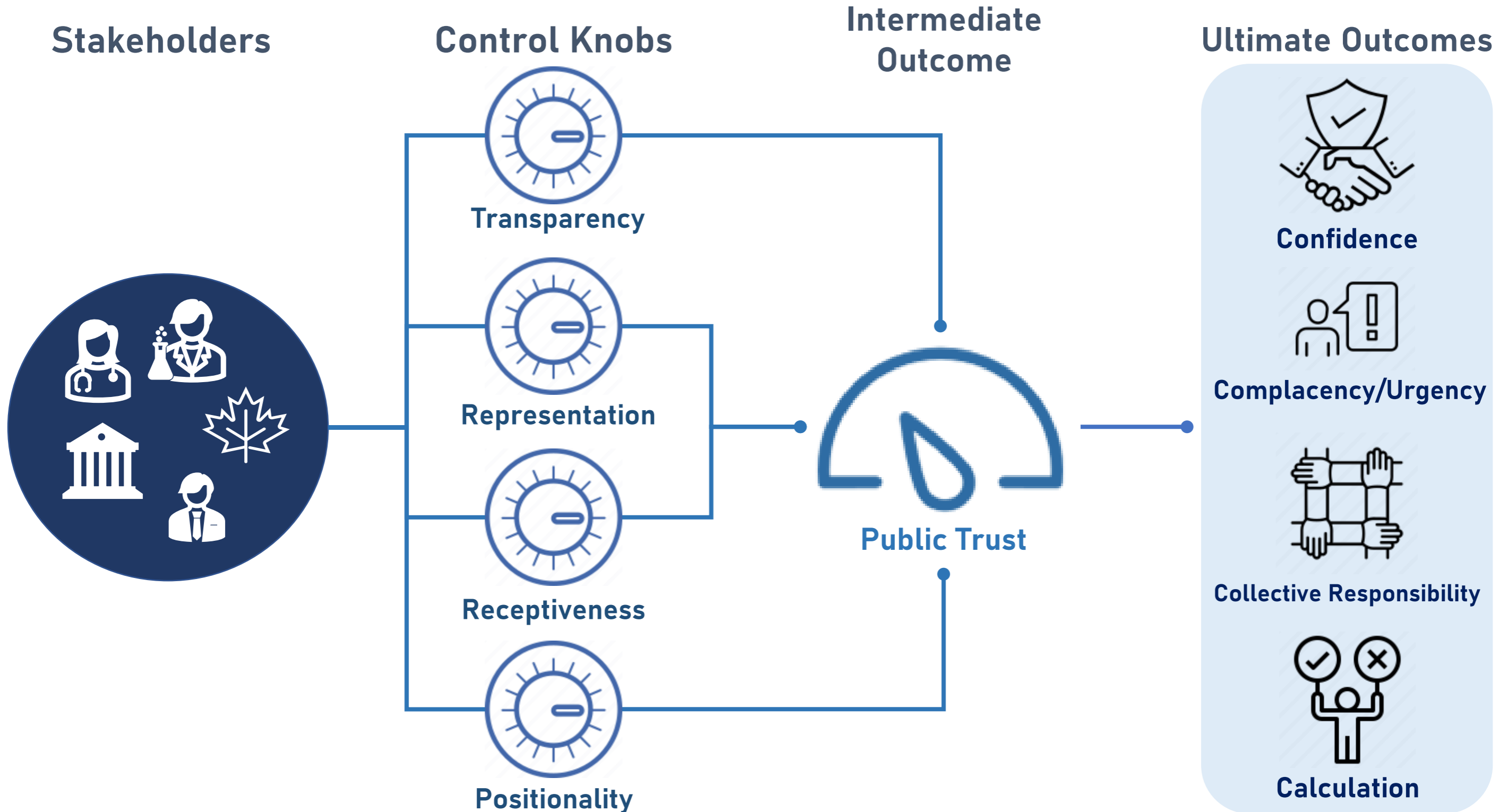
- Incorporate the Sunlight Foundation’s criteria for transparent, equitable and ethical lobbying into strengthened regulations
- Increase regulatory oversight over the relationship between pharmaceutical companies and healthcare practitioners
- Require that recipients of research funds (i.e., CIHR grants) detail, rather than simply declare, the nature of their relationships with industry, and create a registry of researcher-industry relationships

### Provincial Government

- Clarify reasoning for current COVID-19 vaccination protocols, i.e., why pediatric vaccines are provided at certain intervals/dosages

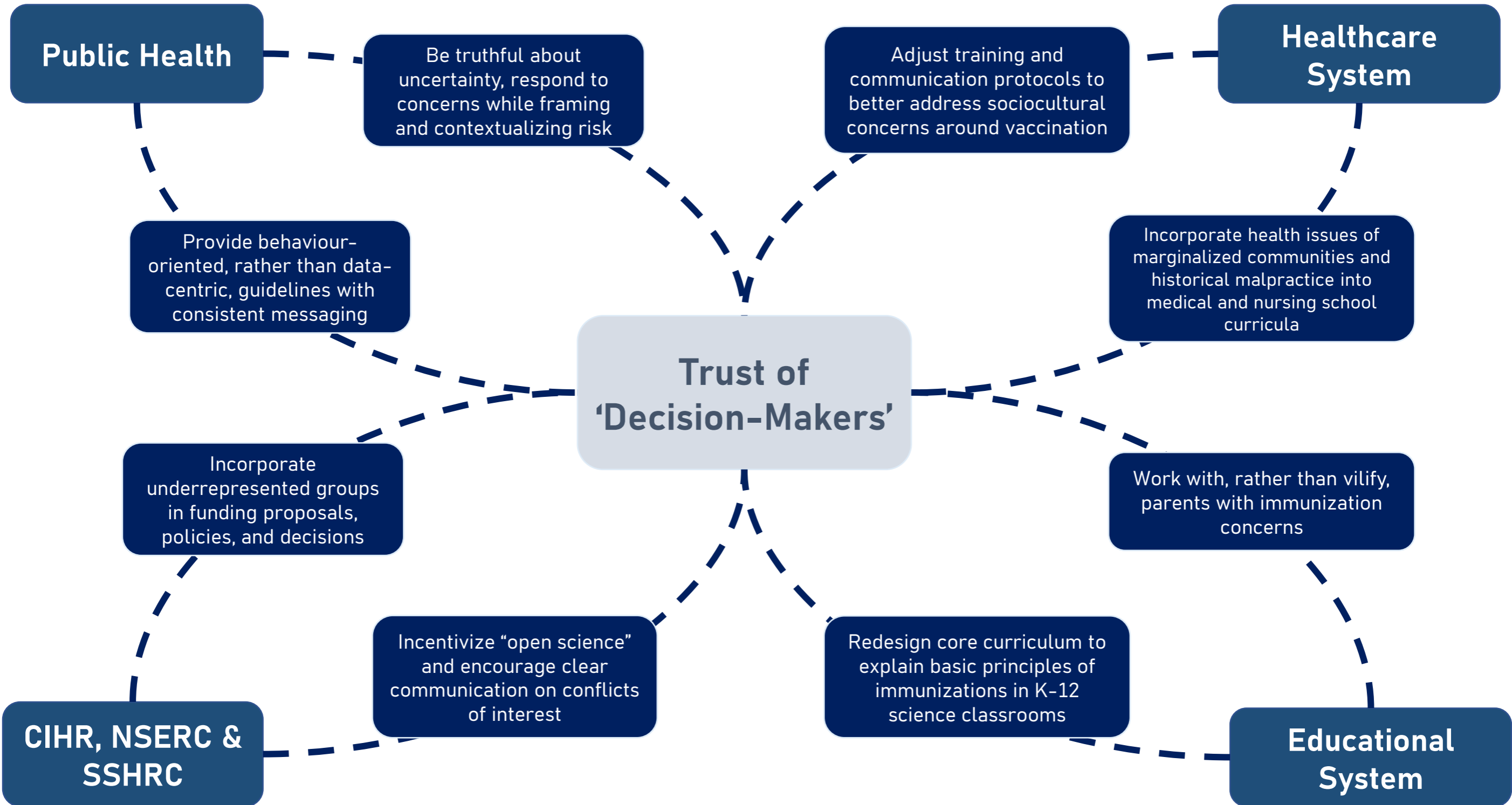
# 'Control Knobs' Framework for Rebuilding Public Trust

Vaccine-Advocate stakeholders can modify 'control knobs' to change public trust, which influences vaccine choice directly by mediating individual assessments of vaccines



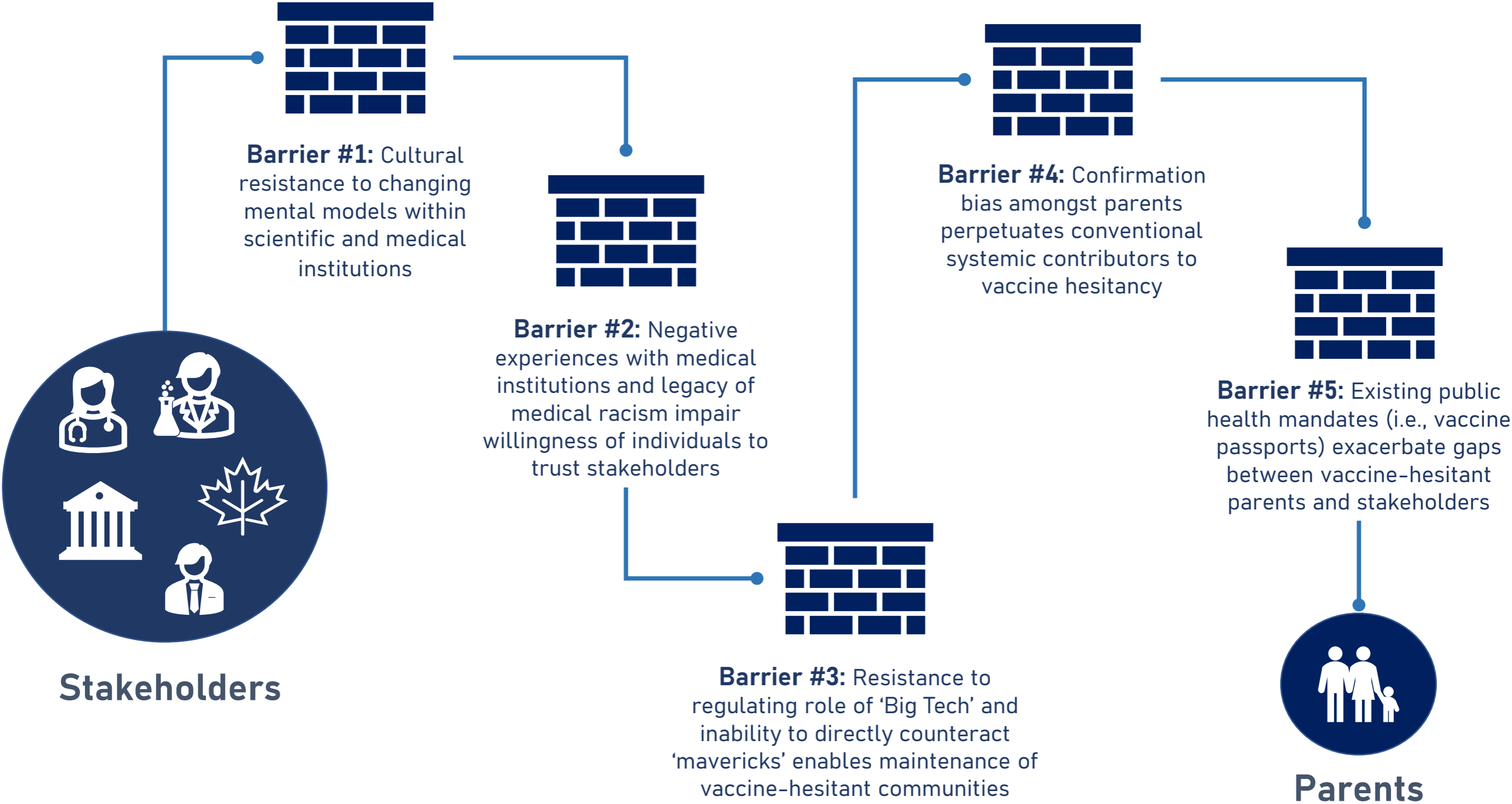
# Rebuilding the Missing Links between Government and Decision-Makers

Current relationship dynamics between governmental bodies and 'decision-makers' do not appreciate the role of trust in reducing vaccine hesitancy. These agencies, and the professional groups they represent, can rebuild their missing links with the public through implementing interventions which focus on trust development



# Navigating Barriers to Implementation

Stakeholders face numerous barriers to the successful implementing interventions which address positionality of vaccine-hesitant parents



# To successfully increase vaccine confidence, all stakeholders must...

- 1 Acknowledge polarizing views and existing biases about the public, which prevent stakeholders from implementing novel interventions
- 2 Design implementations which prioritize the development of public trust in relevant stakeholders

This approach can be applied to gain public buy-in regarding other areas of contested science, such as anthropogenic climate change