

# A Popper–Lakatos Analysis of the CDC’s 2025 Vaccine–Autism Statement: Epistemological and Methodological Considerations

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## Abstract

In November 2025, the U.S. Centers for Disease Control and Prevention (CDC) revised its vaccine safety communications, stating that the claim “vaccines do not cause autism” is not an evidence-based conclusion. This article analyzes the epistemological implications of this revision through the philosophical frameworks of Karl Popper’s falsificationism and Imre Lakatos’s theory of scientific research programmes. I argue that the CDC’s language misrepresents the logical structure of scientific reasoning and the evidential status of negative causal findings in epidemiology. From a Popperian perspective, the causal hypothesis linking vaccines to autism has been repeatedly tested and rejected. From a Lakatosian standpoint, the hypothesis exhibits the characteristics of a degenerative research programme. Consequently, the revised CDC wording reflects a departure from methodological norms and introduces epistemic ambiguity into public scientific discourse.

## 1 Introduction

Since the late 1990s, the hypothesis that childhood vaccines cause autism spectrum disorder (ASD) has been extensively investigated. Large-scale cohort studies across populations have consistently failed to demonstrate any causal association between vaccination and autism (Taylor 2014, Jain 2015, Hviid 2019). In November 2025, the CDC revised its website language, stating that the claim “vaccines do not cause autism” is “not evidence-based.” This article evaluates that wording through the lens of philosophy of science, particularly the theories of Karl Popper and Imre Lakatos.

## 2 Popperian Falsificationism and the Logic of Causal Rejection

### 2.1 Scientific Method and Falsifiability

Karl Popper (Popper 1959) held that science advances by proposing bold hypotheses and rejecting those falsified by empirical testing. While universal negatives (“X never causes Y”) cannot be proven, specific causal hypotheses like:

$H_1$ : Vaccines cause autism

can be tested and rejected if they repeatedly fail empirical scrutiny.

### 2.2 Epidemiology and Evidence of Absence

Negative evidence is not the same as lack of evidence. When studies are high-powered, replicated, and methodologically rigorous, consistent null results constitute *evidence of absence*. This is the case with vaccine-autism studies (Taylor 2014, Hviid 2019, Jain 2015, IOM 2012).

### 2.3 The CDC’s Misapplication of Popperian Logic

By suggesting that rejection of a causal link is “not evidence-based,” the CDC implies that science requires positive proof of a universal negative—an impossibility in Popperian logic. The appropriate formulation is:

“The hypothesis that vaccines cause autism has been tested and falsified.”

## 3 Lakatosian Research Programmes and Degeneracy in Science

### 3.1 The Structure of Research Programmes

Imre Lakatos (Lakatos 1978) proposed that science advances through research programmes composed of a “hard core” of central assumptions and a “protective belt” of auxiliary hypotheses. Programmes are *progressive* when they generate novel findings; they are *degenerative* when they rely on ad hoc explanations.

### 3.2 Vaccine–Autism Hypothesis as Degenerative

The original vaccine-autism hypothesis has mutated—shifting from MMR to thimerosal, aluminum, immune overload, etc.—without predictive success. Each shift followed the falsification of a prior version, indicating degeneracy.

### 3.3 Modern Autism Research as Progressive

In contrast, current autism research—spanning genetics, neurodevelopment, and environmental factors—has produced robust, predictive models and is therefore progressive in Lakatosian terms.

### 3.4 CDC’s Framing and Research Programme Demarcation

Failing to recognize the vaccine-autism hypothesis as degenerative undermines the public understanding of why certain scientific programmes are abandoned. Lakatosian methodology demands that science differentiate between abandoned and progressive lines of inquiry.

## 4 Burden of Proof and Argument from Ignorance

The CDC’s statement reflects a classic fallacy: the argument from ignorance. Scientific reasoning places the burden of proof on the claimant (“vaccines cause autism”). The consistent failure of this hypothesis in testing means it no longer merits epistemic neutrality.

## 5 Epistemic Responsibility and Scientific Communication

Popper and Lakatos emphasized clarity and methodological integrity. Ambiguous statements about discredited hypotheses risk conflating falsified theories with ongoing debate and weakening public trust in science (Nyhan 2015).

## 6 Conclusion

This analysis concludes that:

1. The vaccine-autism hypothesis has been empirically falsified.
2. It constitutes a degenerative research programme.
3. The CDC’s 2025 statement misrepresents the epistemic status of a falsified claim.
4. A scientifically accurate statement would be:  
*“The hypothesis that vaccines cause autism has been rigorously tested and consistently rejected by high-quality evidence.”*

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