# A Critical Review of Radiation Communication Strategies: Analyzing the 40-Year Scientific Discourse on Chernobyl

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## 1. Introduction

As the 40th anniversary of the Chernobyl accident approaches in 2026, a persistent gap remains between scientific evidence and public perception. This study provides a critical review of radiation communication over the past fouy decades. Moving beyond simple descriptive synthesis, this paper employs a systematic qualitative approach to identify why scientific facts have failed to mitigate public fear and how 'public myths' have been systematically reinforced.

While previous risk communication studies have largely focused in institutional messaging strategies, this study uniquely integrates recent NGS-based genomic evidence into a discourse-analytic framework to trace the structural formation of radiation myths.

## 2. Methods and Results

### *2.1. Research Methodology:*

A systematic qualitative framework to ensure methodological rigor, this study utilized a thematic literature review combined with critical discourse analysis(CDA). The data collection followed explicit inclusion criteria:(1) official technical reports form UNSCEAR, WHO, and IAEA(1986-2026), (2) peer-reviewed genomic studies(e.g., Science, 2021), and (3) representative socio-cultural artifacts(e.g., HBO's Chernobyl, S.T.A.L.K.E.R. series)

A total of 11 high-impact and representative sources were purposively selected to capture key scientific, institutional, and socio-cultural narratives, with gray literature and non-peer-reviewed media content excluded unless directly referenced in official assessments.

The analytical process was structured into three stages:

- **Open Coding:** Extracting initial concepts such as 'information vacuum' and 'sensational imagery'
- **Categorization**: Grouping codes into themes of ' Institutional District' and 'Pop-culture reinforcement'
- **Thematic synthesis**: Aligning these categories with recent NGS findings to evaluate the divergence between science and society

The coding process was conducted oteratively: finding from official reports were compared against media narratives and genomic studies to identify divergences, ensuring consistency and analytical rigor.

These analytical steps were designed to directly address the study's research questions regarding the origin of public myths, the persistence of perception gaps, and the role of emerging genomic evidence.

### *2.2 Formation of the public myth: The communication failure*

The analysis identifies three 'Dissonance Points' where communication failed:

- **Information Vacuum:** : The initial 36-hour silence fostered fundamental distrust that remains unresolved.
- **Sensationalism and Visual Imagery**: Media -driven haunting imagery of abandoned cities amplified primal fears of invisible radiation.
- **Pop Culture Reinforcement:** Dramatized portrayals solidified the image of a permanent 'dead zone', overshaowing actual ecological recovery data.

### *2.3 Scientific Findings and Recent Genomic Advancements*

In contrast to the 'Public Myth' official records(IAEA/WHO) and recent NGS research provide definitive rebuttals:

- ***Acute & Chronic Health Effects**: Confirmed(134 liquidators) and manageable thyroid cancer rates contrast with myths of 'mass deaaths'*
- ***Trans-generational Genomic Impacts**: Recent studies using NGS confirm that radiation exposure in parents did not lead to an increase in de NOVO mutations in children, refuting the fear of 'genetic monsters'*
- *P**sychosocial impact**: Paradoxically, the greatest health impacts were not from radiation itself but from forced relocation, and persistent anxiety*


*[ figure 1. Digital times. Chernobyl wild-heaven]*

### 3. Conclusions

Chernobyl serves as a textbook example of how communication failure can be more damaging than the radiation itself. To bridge this gap, this study proposes a multi-layered strategy:

- **Prioritize transparency:** Early-stage honesty is the foundation of trust
- **Utilize Confirmatory Science**: Leverage the latest genomic findings(NGS) to provide affirmative, evidence-based reassurance
- **Empathize with Emotions**: Do not dismiss public anxiety as irrational: acknowledge the fear to begin the dialogue
- **Empower Science Communications**: Experts must translate complex genomic data into accessible, empathetic narratives that acknoledge public anxiety rather than dismissing it.

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