



## A Re-emerging Threat: Classical Swine Fever in Northeast Regions

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Classical Swine Fever (CSF), historically known as hog cholera, is a viral disease of global veterinary importance affecting domestic pigs and wild suids. After decades of control efforts, CSF remains endemic and re-emergent in parts of northeast India, where farming systems and pig demographics enhance viral persistence and spread. This article synthesizes the biology, epidemiology, and regional threat of CSF from scientific studies and livestock data.

### Introduction

Classical Swine Fever is caused by the Classical Swine Fever Virus (CSFV) — a positive-sense, enveloped RNA virus in the genus Pestivirus of the family Flaviviridae. CSFV is closely related to pestiviruses affecting cattle and sheep, but it is specific to suids. Infection can range from acute, high-mortality disease to subclinical, chronic infection, depending on strain virulence and host immunity. CSF affects the immune and vascular systems of pigs, leading to fever, haemorrhages, immunosuppression, and often death. In acute outbreaks in naive pig populations, mortality can approach near-total loss. Diagnostic methods include ELISA, antigen assays, and RT-PCR for early viral detection.

### Reasons behind high risk zones in NE Regions:

#### Pig Demographics & Livestock Patterns

According to India's latest livestock census data (20th National Livestock Census), the country has approximately 9.06 million pigs, with nearly 47 % of them located in northeast states such as Assam, Manipur, Nagaland, Meghalaya, Mizoram, Tripura, and Arunachal Pradesh. Most pigs are kept in backyard and smallholder systems, where biosecurity is low and animal movement is frequent. Backyard rearing with minimal husbandry infrastructure creates ideal conditions for virus maintenance and spread through direct contact, fomites, and shared water/feed. Northeast states contribute disproportionately to national pork production, making CSF outbreaks not only an animal health issue but also an economic and food security challenge.

#### Endemic Circulation and Viral Genotypes

Molecular studies from Assam demonstrate that multiple CSFV genetic subtypes (subgroups 1.1 and emerging 2.2) circulate in northeast pig populations. Viral genotypes can influence how the disease spreads and how effective vaccines are against diverse strains.

#### Epidemiological Evidence: Seroprevalence & Viral Persistence

Region-specific surveys show high chronic exposure rates among pigs: A seroprevalence study across Meghalaya and Manipur found that about 45 % of tested pigs had antibodies to CSFV, indicating past or ongoing viral exposure. National meta-analyses further suggest that across India, pooled CSF prevalence estimates range from ~37 % to ~45 % in pig

populations, reflecting both endemicity and local outbreak patterns. This high baseline prevalence implies that infection is not sporadic but rather persistent and embedded in pig populations, especially in regions with limited veterinary infrastructure.

### **Wild Suids and Cross-Species Persistence**

CSF is not limited to domestic pigs. Wild hogs and feral pig populations in northeast India have been documented with CSFV infection, antibodies, and viral genomes closely matching domestic strains. This wild reservoir complicates eradication efforts, as wild suids can sustain virus circulation independently of managed herds. The presence of CSF in free-ranging wild pigs also underlines the ecosystem linkage between wildlife and domestic livestock health — an important concept in modern “One Health” disease control.

### **Disease Control Challenges in the Northeast- Vaccine Limitations**

Vaccination remains a primary tool for CSF management. However, traditional lapinized CSF vaccines used historically in India have faced production and distribution constraints. Emergence of novel viral genotypes raises questions about the cross-protective efficacy of existing vaccines. Backyard farms often lack access to regular vaccination campaigns and veterinary follow-up.

### **Biosecurity & Informal Trade**

Poor farm biosecurity, animal movement without health certification, and informal livestock markets heighten risk of viral introduction and spread. The lack of controlled movement and systematic surveillance enables CSF virus to persist and move across tribal and border regions.

### **Implications for Animal Health and Economy**

CSF is not a human health concern, but it has profound implications for livelihoods, rural economies, and food systems. High pig mortality can devastate household income for subsistence farmers and tribal communities. Trade restrictions following outbreaks can disrupt regional pork markets, reducing both supply and revenue. Persistent endemic disease undermines confidence in pig rearing and may lead farmers to abandon livestock, affecting cultural and economic practices.

### **Broader Context: CSF Re-emergence Elsewhere**

CSF's re-emergence is not unique to India. In 2018, Japan reported outbreaks after 26 years without disease, driven by the same pestivirus family and requiring renewed surveillance and vaccination of wild boar. This international pattern underscores that even regions with past control can see resurgences if monitoring, vaccination, and wildlife management are not sustained.

### **Path Forward: Integrated Disease Management**

Addressing CSF in the northeast requires multifaceted strategies, including:

- Enhanced surveillance combining serological and molecular diagnostics.
- Routine vaccination programs, tailored to genotype shifts.
- Biosecurity education for smallholders and community engagement.
- Wildlife surveillance and control, integrating ecological considerations.
- Scientific reviews emphasize that combining these approaches rather than any single intervention maximizes the likelihood of reducing viral transmission and stabilizing pig production systems.

### **Conclusion**

Classical Swine Fever remains a biological and socio-economic challenge in the northeast regions due to its viral adaptability, high prevalence, endemicity in domestic and wild suids, and structural limitations in disease control. While not a direct human health threat, its impacts ripple through agricultural livelihoods and regional food systems. Future progress

hinges on robust surveillance, vaccination strategy adjustments to evolving genotypes, and community-level biosecurity strengthening.

### References

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