FREE SAMPLE

Outbreak Investigations
Diary of a Shoe-Leather Epidemiologist

Complimentary Excerpt

Includes the Preface and Part 1:
The Foundational Failures

Dr. Rakesh PS

Thank you for reading this complimentary excerpt.
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Preface

In 2012, fresh from completing my MD in Community Medicine, I stepped into the role of District Epidemiologist in Kollam, Kerala. At the time, the term 'epidemiologist' was foreign to most of my family and friends. Despite a modest salary of 27,000 INR, that period remains the most formative and favoured chapter of my career.

This book is born from that time—a technical memoir and a field guide rooted in the investigation and containment of more than 20 diverse outbreaks.

Field epidemiology is often described as 'shoe-leather' work, but to me, it felt like being a detective. It was a thrilling, often exhausting journey: sleepless nights spent tracing a source, the adrenaline of connecting disparate data points and the high-stakes mission of protecting public health. This book offers an open and honest depiction of that journey, moving beyond the sterile environment of a classroom into the unpredictable reality of the field.

I have written this 'Diary' to serve as a practical companion to the standard public health curriculum. My goal is to help public health students and young epidemiologists understand the nuances of field challenges—from logistical hurdles to the human element of disease—and to equip them with the essential skills required for real-world investigations.

I view this book as a conversation. I would be honoured to receive your feedback directly at **rakeshrenjini@gmail.com** or to read your critical reviews and reflections by tagging me on social media:

- **LinkedIn:** Rakesh PS
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Whether you are a student, a researcher or a public health practitioner, I hope these pages inspire you to embrace the ‘detective work’ that defines our vital field.

Rakesh PS

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Part 1

The Foundational Failures

The high cost of systemic errors in surveillance and response.

The Cost of a Whispering Data Point

In 2006, a massive Chikungunya outbreak tore through Kerala. My father was the District Surveillance Officer for the Integrated Disease Surveillance Project in Pathanamthitta—a rural district in southern Kerala characterized by its rugged Western Ghats terrain, extensive forest cover and a robust plantation economy centred on rubber and spices. I was a young intern in Community Medicine, dispatched for a two-day posting to assist the district's response to the outbreak. What I witnessed was not just a medical crisis; it was a total systemic collapse!

The hospitals did not just overflow; they drowned. Every inch of floor space was claimed by the sick. Additional medical shelters were erected in haste, yet desperate crowds still fought at the gates, pleading for a glimpse of a doctor. The fever clinics were scenes of endless, weary queues where patients—weakened by agonizing pain—simply collapsed where they stood. I remember consulting more than 300 patients on my first day alone. There were no smiles. There was only the grim, exhausted rhythm of survival.

I volunteered to stay and my department agreed. That was the 'Golden Era' of the National Rural Health Mission and for the first time, money was no object. When a staff member mentioned a shop was closed to photocopy a document, a high-ranking official snapped, "Then, buy the Xerox machine now!" The entire health system ran day and night with the precision of a war machine. Experts from all over the country descended there and massive awareness campaigns were launched.

But it was too late.

We had the money and the passion, but we lacked the hands. Most of the health staff and the community were already bedridden. In the quiet of the night, in a small village shelter where I assisted a lone doctor, the influx of the sick never stopped. Sleep became a

forgotten luxury. It was surreal and humbling—to realize that the entire human race was being kept in a state of sheer panic by a mosquito. Despite our frantic efforts, the mosquitoes won. The desperate snap to ‘buy the Xerox machine now’ was too late to change the outcome. The epidemic touched almost every household in the district.

Later, my father showed me a weekly surveillance report destined for the state capital. It was six months old. On that week, the data entry operator had recorded 1,041 cases of fever—a staggering leap from the usual average of 250. They had seen the numbers rising months before. They knew it wasn't a ‘typical’ fever. They knew it was a high-grade and associated with bone-breaking joint pain. Yet, they never realized it was Chikungunya and they never imagined it would explode into an era-defining catastrophe. While the system collected data, it failed to interpret the ‘atypical’ signals as a trigger for immediate intervention.

This alarming spike was not buried in a drawer; it was presented and discussed in numerous state-level meetings. Yet, the system remained paralyzed. Despite the data staring them in the face, officials hesitated, caught in a fog of ignorance and indecision. They were waiting for a certainty that the data was already screaming—but by the time they chose to act, the spark had already become an uncontrollable inferno.

Years later, whenever I read about the necessity of disease surveillance, that 1,041 cases report flashes before my eyes. I always think about that system which collected data but failed in timeliness, interpretation and action, ultimately proving that data alone is not surveillance if it does not protect the population.

What if that trend had been identified early? What if we had investigated the ‘atypical’ nature of those first few cases? If we had identified the vector and initiated the response months earlier, we could have changed the course of history. We would have saved

thousands from agony, preserved millions in resources and maintained the community's sacred trust in the health system.

If a time machine existed, I would return to 2006—not to stockpile medicine or hire more hands, but to stand beside my father and colleagues and help them turn that 'post-mortem' data into a living defense. I would help them recognize that the 1,041 cases weren't just a statistic, but a call to arms. We would rewrite the story: not as a chronicle of a system drowning in an inferno but as a testament to the power of a proactive shield—proving that when we truly listen to what the data is whispering, we can stay one step ahead of the mosquito and transform a looming catastrophe into a managed victory

"But Have You Tested It?" — The Transition from Story to Science

The humid heat of Kaniyambadi, Vellore, didn't just stick to our skin; it carried the weight of a looming disaster. My two colleagues and I were no longer just first-year postgraduates in Community Medicine—in our minds, we were medical detectives on the trail of a killer.

The field staff's report had been grim: a sudden, violent surge of diarrhea. As we raced towards the village, the reality hit us hard. Twenty victims in just 48 hours. Watery stools. The unmistakable stench of a crisis. We launched into a frenzy of activity—interviewing village elders, scouring homes for clues and mapping the spread of the sickness with frantic energy.

Then, the phone rang. It was the lab. 'It's Cholera.'

In that instant, the dusty streets of rural Tamil Nadu transformed. I felt as if the clock had wound back to the fog-filled alleys of 1854 London. I could almost feel the ghost of John Snow guiding my hand as I grabbed my clipboard.

We marched along the village pipelines, tracing the iron veins that brought water to the people. We plotted our 'Spot Map'—a constellation of sickness—and there it was, glaring back at us: a dense cluster of cases surrounding Water Tank A. The evidence felt absolute undeniable. I remember the rush of adrenaline; 'Eureka!'

With the fire of certainty, we didn't just suggest action—we demanded it. We rallied the authorities, chlorinated the tanks and flooded the community with ORS and life-saving education. And it worked. The outbreak began to wither and die.

A few days later, flush with the 'ego' of a hero, I stood before our Professor, Dr. Vinohar Balraj. I laid out the maps, traced the epidemic curves and narrated our victory with a flourish. I was

waiting for the laurel, the nod of approval, the praise for my brilliant deduction.

Instead, the professor's voice cut through the air with cold, academic precision. The room went silent.

"Have you tested your hypothesis?"

The 'John Snows'of Kaniyambadi looked at one another, stunned.

"You guys are only halfway through," he warned, his eyes searching ours. "You have formed a story but you have not proven it."

I remember thinking, "how could he expect first-year PGs to pull off a Case-Control study or a retrospective cohort in the middle of a chaotic outbreak?" We didn't have a research team and we had a village in crisis. We were soon swept back into the relentless chaos of the clinics and that formal 'testing of the hypothesis' remained undone.

Later, I realized, he wasn't dismissing our work; he was defining our profession. The lesson wasn't about the difficulty—it was about the truth. In epidemiology, 'testing the hypothesis' involves using a comparison group to determine if the exposure (Tank A water) is statistically linked to the illness. Without this, our conclusion—while logical—remained an 'educated guess' based on observation alone. To truly 'test' it, we needed the numbers. We would have needed to conduct an Analytical Epidemiologic Study, typically a Case-Control Study where we would select a group of people who had cholera (Cases) and a group of healthy neighbours (Controls) and would then ask both groups if they drank water from Tank A. If the Cases were significantly more likely to have used Tank A than the Controls, our hypothesis is supported by data. Or, we could have conducted a Retrospective Cohort Study. Since the village population is likely well-defined, we could have surveyed the entire street and compared the Attack Rate (the percentage of people who got sick) among those who drank from Tank A versus those who

drank from Tank B. If the risk for those using Tank A was substantially higher than those using Tank B, the hypothesis is confirmed.

We needed an Odds Ratio or a Relative Risk to prove Tank A wasn't just a landmark near the sick, but the actual weapon that had struck them down. When I realised the same, the ego died and the scientist was born. Now, every time a mysterious shadow falls over a community and I start to hunt for the source, a haunting question echoes in my mind:

"It’s a good story... but have you tested your hypothesis?"

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The complete book is available through
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