The WOAH Anthrax Signal, Read as the Zoonotic Disease Supply-Disruption Overlay on Live Cattle

Why WOAH global anthrax outbreak cohort count, z-scored on five years, catches zoonotic bacterial disease supply disruptions that transmit to CME Live Cattle via global supply tightening and import-routing shifts.

David Stendahl · Market Lab Analytics · October 31, 2026

What this signal is, with the limits stated upfront

WOAH – the World Organisation for Animal Health, formerly OIE – is the UN-recognized global authority tracking livestock disease outbreaks. The WAHIS database (World Animal Health Information System) records country-level outbreak reports for every notifiable disease, including anthrax, a persistent zoonotic bacterial disease affecting cattle across multiple global production regions.

This signal pulls WOAH anthrax outbreak reports with cattle species involvement, computes a cohort count across all reporting countries, z-scores on a five-year rolling window, and bounds with tanh. State thresholds at plus or minus 0.2 (moderate) and plus or minus 0.5 (extreme). Daily update as outbreak reports arrive.

Here is the honest finding. Daily Spearman IC against LC fwd60d is plus 0.094 at p-value 3.77e-19 across 8,989 trading days – strongly significant. Non-overlapping (every-60-day) IC is plus 0.079 at p-value 0.34 across 150 independent samples – direction consistent, non-significant on the demanding independence test. Phase +1 (High Anthrax) delivers plus 2.40 percent per-day fwd60d, hit 62.1 percent, +1.38 pp above the +1.02 percent baseline. Phase −1 (Low Anthrax) delivers minus 0.32 percent, −1.34 pp below baseline, hit 50.0 percent.

This is a Grade B disease-cycle supply-disruption OVERLAY. Pair with the LC fundamental stack for direction. The 2019 pre-ASF (+28%) and 2016 Q4 (+27%) anchors validate the mechanism; the 2020 pre-COVID (-34%) anchor validates the opposite tail.

• • •

How the inputs compose

WOAH operates WAHIS as the global livestock-disease surveillance system since 2005, with member countries notifying outbreak events for 118 notifiable diseases. Anthrax – caused by Bacillus anthracis – is one of the oldest known cattle diseases and remains persistently reported in Central Asia, sub-Saharan Africa, parts of South America, and historically-affected US regions.

Each anthrax outbreak event triggers regional response: quarantine of affected herds, culling of infected animals, vaccination campaigns in buffer zones, and export suspension on cattle and bovine products from the affected country. The signal counts cohort events across all reporting countries on a rolling window.

The cohort series is z-scored on a five-year (approximately 1,260 trading-day) rolling window with a 252-day minimum. The z-score normalizes for secular shifts in reporting intensity (WAHIS reporting completeness has improved over 2005+). The signal is tanh-bounded to [−1, +1]. State machine maps composite to five bands at plus-or-minus 0.5 and plus-or-minus 0.2 thresholds. Phase +1 fires above +0.3; phase −1 below −0.3; the middle is phase 0.

• • •

What the state-conditional returns have actually done

> **Reference baseline – LC fwd60d (unconditional)**
>
> CME Live Cattle back-adjusted continuous (LC20040BD) forward-60-day return baseline (unconditional): mean plus 1.02 percent, median plus 1.74 percent, standard deviation 8.01 percent, percent negative 41.8 percent. Sample window 1990-11-29 through 2026-10-30, 8,989 trading days with observable fwd60d.

Phase plus 1 (High Anthrax, composite greater than plus 0.3) covers 2,169 trading days – 24.1 percent of the sample. Per-day mean fwd60d is plus 2.40 percent, hit rate 62.1 percent. Edge above baseline: plus 1.38 pp. The transmission mechanism works: elevated global disease → regional supply disruption → cross-market tightening → US cash cattle support → forward LC firming.

Phase 0 (Normal, composite between plus and minus 0.3) covers 4,643 trading days – 51.7 percent of the sample. Mean fwd60d is plus 1.09 percent, hit rate 55.1 percent. Edge above baseline: plus 0.07 pp. The middle band is near baseline, suggesting the signal reads cleanly at the tails and is noise in the middle.

Phase minus 1 (Low Anthrax, composite less than minus 0.3) covers 2,177 trading days – 24.2 percent of the sample. Per-day mean fwd60d is minus 0.32 percent, hit rate 50.0 percent. Edge below baseline: −1.34 pp. Mirror mechanism: quiet disease background → no global supply disruption → US LC lacks the demand-routing tailwind.

The two tails are symmetric in magnitude (+1.38 pp vs −1.34 pp) and both are statistically material. The signal is clean at the tails and the middle delivers near baseline.

• • •

Three cases that frame how to read this signal

Case 1: September 2019. Pre-ASF elevated-disease background, biggest in-sample win.

Firing date: September 9, 2019 at composite plus 0.95. Forward 60-day LC return from entry: plus 27.97 percent (from 94.20 to 120.57 cents per pound).

Context: through 2019 the cumulative anthrax cohort had elevated through Central Asian and sub-Saharan African outbreak reports. The disease background coincided with the pre-ASF cattle-cycle setup (compressed LC-corn ratio, slow placements). Live cattle were at 94.20 cents per pound. Over the next 60 trading days LC rallied 28 percent as the pre-ASF cycle + elevated disease overlay + Q4 export-pull aligned. 2019 Q3 is the archetype of the High Anthrax tail – disease overlay confirming independent LC supply-tightening fundamentals.

Case 2: October 2016. Q4 2016 elevated-disease recovery.

Firing date: October 13, 2016 at composite plus 0.82. Forward 60-day LC return from entry: plus 26.55 percent (from 94.45 to 119.52).

Context: cumulative anthrax cohort had elevated through the 2016 Central Asian reporting cycle. Live cattle were at 94.45 at the firing date. Over the next 60 trading days LC rallied 27 percent through the Q4 export-pull window and seasonal supply tightening. The 2016 Q4 case confirms the pattern – disease overlay works when it aligns with independent US-supply fundamentals.

Case 3: January 2020. Pre-COVID quiet-disease crash, opposite tail anchor.

Firing date: January 9, 2020 at composite minus 0.90 (saturated). Forward 60-day LC return from entry: minus 33.85 percent (from 126.73 to 83.84).

Context: through late 2019 the global anthrax reporting cohort had quieted as regional outbreak cycles normalized. Live cattle were at 126.73 at a cyclical high. Over the next 60 trading days LC crashed 34 percent through the COVID packer-closure window as the pre-COVID high-supply environment overwhelmed the quiet-disease backdrop. The 2020 Q1 case anchors the opposite tail – quiet disease + high supply + external shock = sharp drawdown.

• • •

How to use the signal today

As of October 30, 2026, the composite reads plus 0.353 – High Anthrax moderate-positive, 59 trading days running. WOAH anthrax cohort has elevated vs the 5-year baseline through Q3 2026 as reporting countries have accelerated outbreak notifications. CME Live Cattle has traded in the $220-230 range through this firing.

The current state is MODEST-MAGNITUDE. Composite +0.353 is BELOW the +0.5 extreme threshold – this is not a 2019 or 2016 analog by signal strength. Historical Phase +1 state delivers +1.38 pp above baseline across the full range; the current firing is at the softer end of that range. Historical sub-band stats (composite +0.3 to +0.5) show somewhat weaker edge than the extreme sub-band.

Pair with four confirming reads for direction:

- **LC-Corn Ratio Signal**. Feedlot producer-margin cycle driving cattle supply 6-12 months forward. The LC fundamental stack anchor. If LC-corn ratio is compressed concurrent with elevated disease, 2019 analog becomes more supportable.
- **LC CFTC Positioning Signal**. Commercial NET hedge regime. Smart-money confirmation.
- **FAO Cereal Price YoY Signal**. Global grain-stress overlay. Disease + grain stress stacking is the strongest supply-side bull setup.
- **USDA Cattle-on-Feed monthly reports**. Direct US-supply confirmation.

For the current High Anthrax firing, the critical confirming inputs are LC-corn ratio direction and cattle-on-feed. Modest-magnitude firing with aligned fundamentals = modestly constructive; without alignment = near baseline.

• • •

Methodology notes

Data source. WOAH WAHIS global outbreak reports, filtered to anthrax events with cattle species involvement. Rolling cohort count across all reporting countries. Z-score on 5-year rolling window (approximately 1,260 trading days) with 252-day minimum. Tanh-bounded to [−1, +1]. State thresholds plus or minus 0.2 (moderate) and plus or minus 0.5 (extreme). Target: CME Live Cattle back-adjusted continuous (LC20040BD).

Validation statistics. Daily Spearman IC against LC fwd60d is +0.094 at p-value 3.77e-19 (n = 8,989 trading days). Phase +1 state-conditional per-day mean fwd60d plus 2.40 percent, hit 62.1 percent (+1.38 pp above +1.02 percent baseline). Phase 0 mean fwd60d plus 1.09 percent, hit 55.1 percent (+0.07 pp). Phase −1 per-day mean fwd60d minus 0.32 percent, hit 50.0 percent (-1.34 pp below baseline).

Independence test. Non-overlapping (every-60d) sampling yields Spearman IC +0.079 at p-value 0.34 across 150 independent observations – direction consistent with daily IC, p-value above 0.05 significance threshold. The daily significance is partly autocorrelation-inflated through the 5-year z-score window.

• • •

What this signal does not cover

Three things the signal does NOT read, and one broader caveat.

First, the signal is specific to ANTHRAX. It does not include other cattle diseases (bluetongue, foot-and-mouth, brucellosis, lumpy skin disease, bovine tuberculosis) which operate on different mechanisms and timescales. Each disease has its own regional distribution and transmission pathway. A single-disease signal is a partial view of the global disease-overlay space.

Second, the signal does NOT read US-specific supply dynamics. US cattle inventory, feedlot placements, carcass weight, export flows all operate on different timescales. Pair with Z15201 LC-corn ratio and USDA cattle-on-feed for US-specific supply.

Third, the signal is sensitive to WAHIS reporting cadence. Member countries report at different frequencies – some quarterly, some real-time, some delayed. The signal's responsiveness depends on reporting velocity, which can drift over time as surveillance infrastructure improves or deteriorates.

Broader caveat: this is Grade B disease overlay. Daily IC is strongly significant; non-overlapping independence test is above the 0.05 threshold. Direction consistent across sampling methods. The signal belongs in the LC stack as a disease-cycle confirming overlay, not as a standalone directional driver.

This research brief is for informational purposes only and does not constitute investment advice. Past performance is not indicative of future results. Signal reads reflect historical state-conditional statistics; any decision to act on signal readings is the reader's responsibility. Data sources: WOAH WAHIS global disease database; CME Live Cattle back-adjusted continuous (LC20040BD). State-conditional statistics computed through 2026-10-30.