Wholly Preventable: Ten Years of a Never Event That Never Stopped

NHS Wrong-Route Medication Never Events 2018–2024 — Executive Summary

stepchangeanalysis.com | Bootstrap CUSUM SPC Analysis | May 2026 | Syd Stewart, Chartered Chemical Engineer

"Every system is perfectly designed to get the results it gets." — Paul Batalden, IHI Senior Fellow & direct student of W. Edwards Deming

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Note: Analysis uses NHS England Never Events Final Annual Reports, post-2018 framework series only. Pre-2018 data excluded due to framework revision. Confirmatory analysis: NHS England provisional monthly Never Events, April 2019–March 2026, N=84.

Five Key Findings

1

No detectable change point in six years of post-2018 data

Bootstrap CUSUM at 99.7% confidence, N=6 annual aggregates, Loops=1000: one stage, no change point. Mean 17.5 wrong-route Never Events per year. X-mR confirms: all six values within natural process limits (UNPL=30.27, LNPL=4.73). The system is in statistical control — producing wrong-route errors as reliable common cause variation around a stable mean.

Period: 2018–19 to 2023–24 | Mean: 17.5/year | Stages: 1

2

Confirmed by total Never Events monthly series — N=84, 95% confidence

Monthly total Never Events April 2019–March 2026 (N=84, 5000 loops, 95% confidence): one stage, no change point. With N=84 the Bootstrap CUSUM has substantial statistical power. The null result is not an artefact of a small dataset — the entire Never Events system shows the same pattern at a much larger scale.

N=84 monthly | Conf=95% | Loops=5000 | Stages=1 | Mean=34.02/month

3

The engineering solution exists — but has been bypassed by the workflow

ENFit oral syringes physically cannot connect to IV lines. But staff decant oral medication from ENFit syringes into Luer syringes, bypassing the protection entirely. HSIB (2019) confirmed three conditions: mixed storage of oral and IV drugs, dual syringe availability on the same ward, no national double-checking standard. Layer 2 engineering partially implemented. Elimination-level controls not applied.

Root cause: HSIB 2019 | Elimination-level status: not systematically implemented

4

COVID year (2020-21) spiked to 24 — system depends on familiarity not design

Despite reduced NHS activity, wrong-route events rose to 24 in 2020–21 — highest in the series. Staff redeployment to unfamiliar settings and disrupted checking under COVID conditions increased errors. A system with elimination-level controls in place would have been protected from this disruption.

X-mR: 24 within UNPL=30.27 | Common cause variation | COVID year noted

5

The wrong-route count is the canary — fixing it restructures all medication safety

Total medication Never Events run at approximately 60–70 per year across all categories. The system conditions producing wrong-route errors also produce insulin overdoses, methotrexate errors, and midazolam mis-selection. Fix wrong-route at elimination level and the broader medication safety system restructures. O'Neill at Alcoa showed that genuine safety improvement creates knock-on gains across all processes.

Knock-on effect: all medication Never Events | Keystone: wrong-route oral-to-IV pathway

The O'Neill / Deming / Joiner Argument

Framework	Applied to NHS Wrong-Route Never Events
Paul O'Neill at Alcoa (Duhigg, 2012)	O'Neill inherited the safest company in aluminium manufacturing. He declared zero injuries and redesigned the system — not retrained workers. Injury rate fell to 1/20th US average. Market value: $3bn to $27.5bn. The NHS has the same stated standard ("wholly preventable"). The difference is method.
Deming SoPK System / Variation / Knowledge / Psychology	System: the error is produced by the system. Variation: common cause — Serious Incident investigations are a special cause response to a common cause process (tampering). Knowledge: no intervention included a pre-specified CUSUM outcome prediction. Psychology: mandatory investigation creates fear without changing the system.
Joiner Levels of Fix (4th Gen Mgmt, 1994)	Level 1 (Output): 15 years of SI investigations — next event not prevented. Level 2 (Process): MSO mandate, NatSSIPs, checklists — in the timeline, not in the CUSUM. Level 3 (System): pharmacy unit-dose, Luer removal, separated storage — not implemented. This is where the CUSUM change point will appear.
Joiner — Stratify / Experiment / Disaggregate	Stratify: find trusts with zero sustained wrong-route events (Bright Spots). Experiment: pre-specify CUSUM outcome before any intervention — Bootstrap CUSUM is the PDSA Study step. Disaggregate: 16 of 20 events in 2023–24 were oral-to-IV — fix the dominant mechanism.
NIOSH Hierarchy of Controls (adapted)	Elimination (Layer 1): not implemented. Engineering (Layer 2): NRFit mandated Jan 2025 (neuraxial only), ENFit available but decanting workaround persists. Administrative/Training (Layers 3–4): fully implemented for 15 years. The NHS has operated at Layers 3–4 while the problem requires Layer 1.

What Genuine System Change Requires (Joiner Level 3 / NIOSH Layer 1 Elimination)

Elimination-level action	How it works	Expected CUSUM signal
Pharmacy unit-dose oral dispensing	Ward staff never draw up oral liquids — the decanting step is eliminated entirely	Wrong-route count approaches zero within 2–3 years of full implementation
Remove Luer syringes from high-risk settings	Physical barrier — Luer syringe not available to misuse. No staff behaviour change required.	Procurement change. Detectable in CUSUM when applied consistently.
Separate storage of oral and IV formulations	Selection error at source eliminated. Facilities management decision.	Implementable immediately. Combined with unit-dose should eliminate the oral-to-IV mechanism.

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Full interactive analysis, all charts, Bootstrap CUSUM tool and data downloads:

stepchangeanalysis.com/never-events-wrong-route.html

Key References

NHS England Never Events Final Annual Reports 2018–19 to 2023–24, Table 2
HSIB — Inadvertent Administration of Oral Liquid Medicine into a Vein (2019)
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NIOSH Hierarchy of Controls — cdc.gov/niosh/topics/hierarchy
Full article: stepchangeanalysis.com/never-events-wrong-route.html