International QI Congress (sample) | Quality & Safety in Complex Clinical Systems

Co-Producing a SEIPS & Physical Poka-Yoke Quality Control Circle Bundle to Cut Bronchoalveolar Lavage Hypoxemia

Multidisciplinary QI Team | Department of Critical Care & Specialized Nursing, Fictional Tertiary Medical Center (Sample — Fictional Data)

SAMPLE
FICTIONAL

63.3% Relative Reduction in Intra-Procedure Hypoxemia (38.46% -> 14.10%, p < 0.001) While Saving 3.8 Min/Case Nursing Time

PRIMARY OUTCOME
38.46% -> 14.10% (n=390)

16-WEEK IHI RUN CHART
10-Week Shift < Median (p<0.05)

BALANCING MEASURE
9.0 -> 5.2 Min (-42% Nurse Load)

OPEN-ACCESS TOOLKIT
3D Poka-Yoke CAD & WMTY Card

1. INTRODUCTION & WAI-vs-WAD SYSTEM GAP

- **Clinical Burden:** Geriatric RICU patients undergoing bronchoalveolar lavage (BAL) exhibited a 38.46% baseline hypoxemia rate (60/156 across W1–W6), prolonging ventilation and ICU stay.
- **WAI vs WAD Friction:** Written SOPs assumed unhurried two-nurse verification (Work-as-Imagined), whereas heavy night shifts forced manual estimation without angle/thermal locks (Work-as-Done; ~3s SOP click-throughs).
- **International Standards:** Directly aligns with the WHO Global Patient Safety Action Plan & Surviving Sepsis Campaign Hour-1 Bundle.
- **Study Objectives:** Reduce intra-BAL hypoxemia below 17.60% across a 16-week surveillance window via a SEIPS 3.0 & Poka-Yoke QCC bundle without increasing nursing workload.

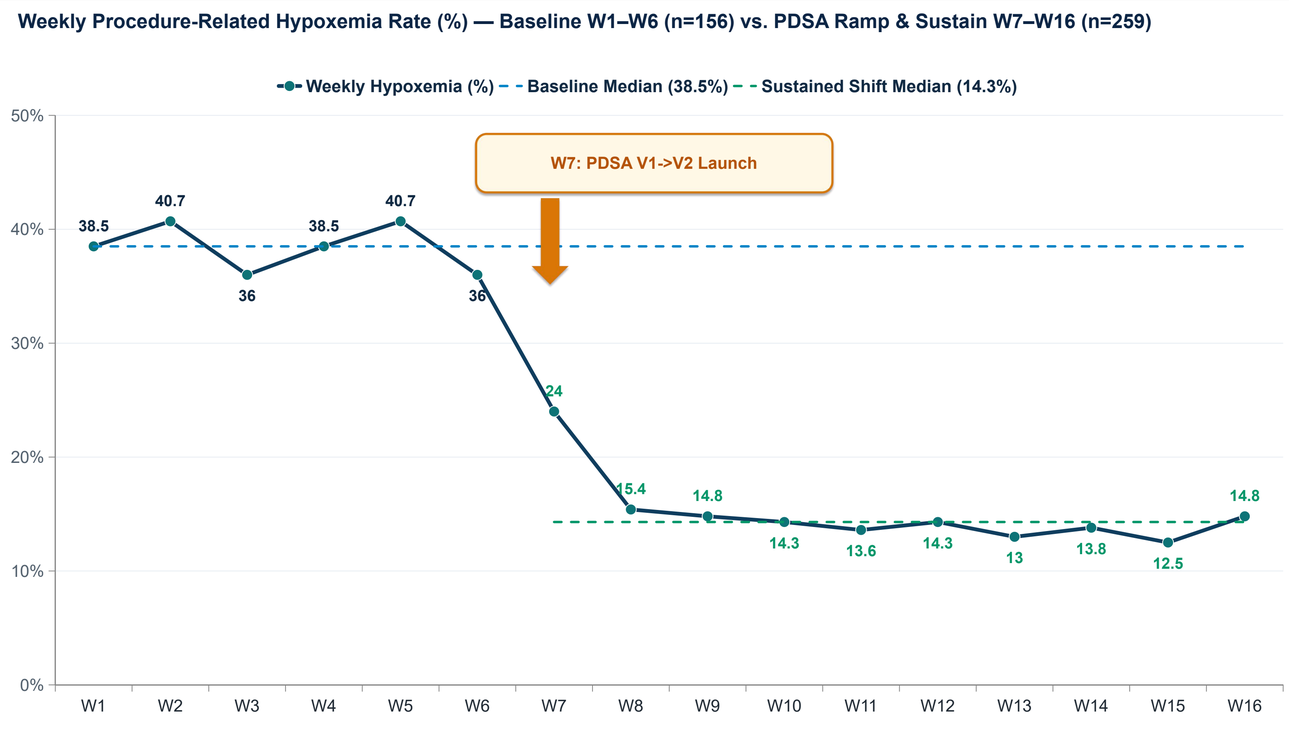
2. GEMBA DIAGNOSIS & HYPOTHESIS FALSIFICATION

Candidate Cause (SEIPS)	Gemba Audit (n=156)	Defect %	Verdict
No 3-node risk hard-stop	EHR log & bedside audit	35.0%	True Cause
Manual lavage temp/angle drift	IR sensor & angle gauge	28.3%	True Cause
Passive verbal pre-op coaching	Patient recall check	18.4%	True Cause
Ward ambient temp fluctuation	30-day dual-shift log	3.3%	Falsified
Catheter stockout in supply	90-day supply inventory	0.0%	Falsified

3. STRONG-ACTION PDSA RAMPS (VA RCA2 HIERARCHY)

- **[STRONG] PDSA 1 · EHR 3-Point Risk Hard-Stop:** Embedded mandatory pre/intra/post SpO2 & frailty scoring into bedside mobile workflow; blocks scope sign-out if high-risk pre-oxygenation protocol is unconfirmed.
- **[STRONG] PDSA 2 · V1->V2 Physical Poka-Yoke:** V1 clamp required 2 nurses and slowed setup -> redesigned V2 snap-fit 37C constant-temp sleeve & 30-45 deg airway port lock (30s single-nurse operation).
- **[CO-DESIGN] PDSA 3 · WMTY Patient Partnership:** Co-designed a 90-second visual breathing guide & bedside 'What Matters to You?' card with 5 recovered patients (386 verified toolkit views).
- **Safety-II Positive Deviance:** Standardized suction-rhythm cues observed from zero-hypoxemia senior nurse shifts across all 28 ward nurses.

4. TIME-SERIES RESULTS: 16-WEEK IHI RUN CHART



- **Statistical & Run-Chart Proof:** Primary hypoxemia fell from 38.46% (60/156, W1–W6) to 14.10% (33/234, W8–W16; chi-square = 30.58, p < 0.001), with 10 consecutive post-launch weeks (W7–W16) below the 38.5% baseline median (Sustained Shift Median = 14.3%; no UCL/LCL plotted on run chart).

5. BALANCING MEASURES, PREMs & GREEN-CARE IMPACT

Domain	Outcome / Balancing Metric	Baseline	Post-QCC	Effect (p-value)
Primary Safety	Intra-BAL Hypoxemia Rate	38.46%	14.10%	-63.3% (p<0.001)
Balancing #1	Nursing Time / Case (Workload)	9.0 min	5.2 min	-3.8 min (p<0.01)
Balancing #2	Unplanned Extubation / Injury	1.28%	0.00%	Zero Harm
Co-Production	Validated Patient PREMs (0-100)	81.2 pts	96.4 pts	+15.2 (p<0.001)
Green Care	Rework Consumable Carbon	1.42 kg	0.61 kg	-57% CO2e

6. SUSTAINABILITY, HOSPITAL SPREAD & GOVERNANCE

- **Institutionalization:** Codified into Hospital Standard SOP-RICU-2026-08 with quarterly 3-month post-audit sustaining >96.2% bundle fidelity across 3 ICU units.
- **Scalability:** 3D-printed poka-yoke sleeve (< USD 12/unit) + EHR rule requires zero extra staffing, enabling rapid transfer to resource-constrained hospitals.
- **Ethics & COI:** Sample congress poster layout — all institution details, audit counts, and clinical outcomes are fictional.