# Care Pathway Analytics with AI Training: Outcome Variation, Safety Signals and Service Redesign

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Rome

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## Programme Summary

Care pathway analytics with AI is the subject of this one-week training course for hospital and health system quality, clinical governance and operations managers at managerial level, ending in a pathway analytics and redesign file for one clinical service. Hospitals hold large records of patient care, yet few teams can read them for variation and risk. The programme moves from the pathway and its data to diagnosis of variation, then to safety signals and redesign, and finally to a sponsor file. Mars Training Centre UK delivers this programme on care pathway analytics with AI to mixed-organisation cohorts.

## The Business Case

Care pathways run across wards, laboratories, imaging and discharge teams, so delays and avoidable differences are rarely visible from one unit. Machine-assisted analysis of event records can map real routes and flag unusual outcomes early, but it also produces false alarms and depends on record quality. Leaders who read the evidence critically can direct effort to the changes that matter.

- Unwarranted Outcome Variation: Is reduced as real pathways are mapped and special causes are separated from normal variation.
- Patient Safety Response Time: Falls as signals are tested, rated and escalated to named reviewers.
- Service Capacity Use: Improves as delays and repeated steps are found and redesigned.

## Principles and Evidence Base

- ISO 7101 Healthcare Organization Quality Management: Frames leadership and continual improvement for care quality, applied in Sessions 1 and 5.
- Statistical Process Control: Uses run and severity-adjusted control charts to separate common-cause from special-cause variation, applied in Session 2.
- ISO/IEC 42001 AI Management System: Sets expectations for controlling AI tools, applied in Session 4.

## Intended Participants

- Quality and patient safety managers who track outcomes and incidents.
- Clinical governance leads who review variation and report to boards.
- Operations managers who run flow, capacity and discharge.
- Health information and performance managers who supply the data behind pathway reviews.

Typical settings include hospitals, regional health systems and specialist clinics.

## Learning Outcomes

1. Participants will be able to evaluate which pathway questions suit AI-supported analysis.
2. Participants will be able to construct a pathway map from event records and test it against clinical practice.
3. Participants will be able to diagnose outcome variation using run and control charts.
4. Participants will be able to prioritise safety signals by severity, reliability and workload.
5. Participants will be able to design redesign options with measures and owners.
6. Participants will be able to justify an analytics and redesign file to a clinical sponsor.

## Programme Structure

### Day 1: Care Pathway Analytics with AI and the Pathway Data

Which pathway questions can data answer, and what must clinicians decide?

- Pathway Scope and Question Sheet
- Event Log Data Map
- Process Mining Discovery Reading
- ISO 7101 Quality Principles Review
- Human Judgement Boundary Sheet

### Day 2: Reading Pathways and Outcome Variation

How far do real routes differ from the intended pathway, and is the difference normal?

- Pathway Variant Comparison
- Run Chart Reading
- Severity-Adjusted Control Chart
- Common Cause and Special Cause Test
- Delay and Waiting Point Analysis

### Day 3: Diagnosing Data Quality and Safety Signals

Which signals deserve review, and how reliable is the record behind them?

- Record Completeness Scorecard
- Coding Variation Check
- Safety Signal Rating Scale
- False Alarm Review Log
- Signal Escalation Ladder

## Day 4: Designing Service Redesign and Model Safeguards

Which changes to the pathway are worth testing, and how is the AI tool controlled?

- Redesign Option Grid
- Measure and Owner Table
- Pilot Test Plan
- ISO/IEC 42001 Control Mapping
- Model Change Approval Rules

## Day 5: Pathway Analytics and Redesign File for One Service

Do the earlier tools combine into one file that a sponsor can act on?

- Applying the Session 1 Question Sheet
- Testing the Session 2 Control Chart
- Checking the Session 3 Rating Scale
- Rehearsing the Session 4 Pilot Test Plan
- Completing the Pathway Analytics File

## Methodology

The programme uses a structured exercise built on prepared files for two clinical services, one surgical and one emergency, each with anonymised event records, outcome series, incident summaries and process descriptions. Participants work in small groups, map pathways, read charts, and defend their conclusions to peers acting as clinical sponsors.

- Suggested activity: Comparing two pathway variants and agreeing which difference needs a clinical explanation.
- Suggested activity: Reading a control chart and deciding whether a rise in outcomes is a signal or normal variation.
- Suggested activity: Rating a list of safety signals and setting the limit for escalation.

## Capstone Output

Each participant completes a pathway analytics and redesign file for one clinical service. It holds a question sheet, a pathway map, a variation reading, a rated signal list, a redesign option with measures and owners, and a safeguard note. The file is used at work to brief a clinical sponsor and agree pilot duties.

## Frequently Asked Questions

### Is a course on care pathway analytics with AI suitable for managers without a data background?

Yes. Care pathway analytics with AI is taught through prepared files and templates. It assumes experience in quality, governance or hospital operations, but no coding.

### Which standards and methods does care pathway analytics with AI rest on?

Care pathway analytics with AI rests on ISO 7101 for healthcare quality management, process mining for pathway discovery, statistical process control for variation and ISO/IEC 42001 for AI tools.

### How is the file from care pathway analytics with AI used at work?

You use the pathway analytics file to brief your clinical sponsor, agree pilot duties with service teams and set the rule for which safety signals are escalated.

### How does care pathway analytics with AI differ from a clinical audit course?

Care pathway analytics with AI concentrates on mapping real routes and reading variation, while a clinical audit course concentrates on checking practice against agreed criteria.