# **Visual Alert Level**

A **visual alert level** in CUSUM analysis is a predefined horizontal line drawn on the chart that serves as a **trigger point** for clinical or educational attention.

It does not always correspond to formal statistical thresholds but is used as a practical tool to:

- Highlight when performance may be deteriorating
- Prompt early review or feedback
- Enhance **interpretability** for supervisors, trainees, or quality officers

#### How It Works

In the CUSUM chart:

- The **y-axis** represents the cumulative deviation from expected performance.
- The **x-axis** represents sequential cases.
- A horizontal dashed line (e.g., at 2.5) indicates the alert threshold.

When the CUSUM curve **crosses this level**, it visually suggests that the number or magnitude of complications exceeds the acceptable trend.

### Why Use a Visual Alert Level?

- Offers a quick and intuitive signal for clinical educators and QA teams
- Simplifies decision-making during resident supervision
- Acts as a communication tool in performance reviews and morbidity & mortality (M&M) meetings
- Encourages **proactive action** rather than reactive analysis

#### Example

In our ICP monitor placement example:

- Target complication rate: k = 0.1
- Visual alert level: CUSUM  $\geq$  2.5
- The CUSUM curve approached this line during the first 12 cases but remained below it, suggesting early variability followed by stabilization.

## Customization

Visual alert levels can be adjusted based on:

- Procedure risk profile
- Surgeon experience level
- Institutional quality standards

They serve not as punitive thresholds, but as **safety-oriented prompts** to reflect and improve.

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