



# ENHANCED CLINICAL WORKFLOW ADHERENCE THROUGH REAL TIME ALERTS AND ESCALATIONS FOR P4P

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## Abstract

Real-time alerts and escalations in hospitals can lead to forecasting, detecting and correcting adverse developments in patients' status. They can impact outcomes such as length of stay, criticality of an event, survival, and death.

A physician/nurse needs timely access to real actionable alerts. These would enable her to make evidence-based decisions on the spot without having to rummage for them through the complex and dynamic healthcare environment. IT systems can help hospitals generate real-time actionable alerts that support clinical decision making, achieving Centers for Medicare and Medicaid Services (CMS) performance measures under Pay for Performance (P4P), and improving reimbursements.

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## Hospitals in the Era of Pay for Performance

Hospitals increasingly face the likelihood of being turned down for reimbursement when patient care falls short of the reimbursement benchmarks set up in clinical care. It is thus important for hospitals to adhere to good clinical practices even as they improve patient outcomes and their healthcare business. The Centers for Medicare and Medicaid Services (CMS) report has specifically identified a set of diseases like heart failure, acute myocardial infarction and pneumonia for P4P and set performance

measures for each of these. The concept of Pay for Performance is based on providing financial incentives to narrow the gap between healthcare guidelines and practice.

CMS collects a set of 30 quality measures as part of its reporting hospital quality data for annual payment updates which require hospitals to submit data for particular quality measures. Few P4P programs impose penalties on poor performers; the approach has largely been to identify and reward the top performers, while

encouraging the spread of “best practices”. Hospitals are facing enormous data reporting and performance pressures to effectively manage healthcare as a business. They need to adhere to high quality patient care and avoid preventable adverse events/errors as good business practices while reducing the cost of healthcare delivery. To this end, physicians need clinical data in realtime so that they can respond to an event as quickly as possible to proactively prevent or reduce any adverse impact.

## How Do Clinical Alerts and Escalations Help?

Alerts are not time consuming and can be triggered off real-time in any hospital. They offer the best way to remind the treatment team of any missed activity. They can prove to be a simple and fast way of achieving clinical adherence to steps that may be missed out in a clinical work process. It is important to generate alerts about laboratory, physiological processes and medication status of patients. The patient care environment is information intensive where medical monitors/devices, clinical examination and laboratory reports generate information. This information needs to be collated to generate actionable

data for timely response to an event. This response in real-time can plug the gaps in the patient care process flow, reduce errors, negligence, and lead to lower cost of patient care.

The alerts can be:

- Critical alerts
- Actionable alerts
- Escalation alerts.

These alerts can be further classified as critical laboratory alerts, critical trend alerts, dynamically adjusted alerts, and exception condition alerts. The medication alerts could be dose alerts, type alerts, lab

alerts, lab trend alerts, interaction alerts, and allergy alerts.

A real-time actionable alert can initiate compliance with a critical path in a process and result in:

- Saving a life
- Reducing the criticality of an event
- Improving outcomes that might be missed due to clinical workload and the complexity of information in a healthcare environment

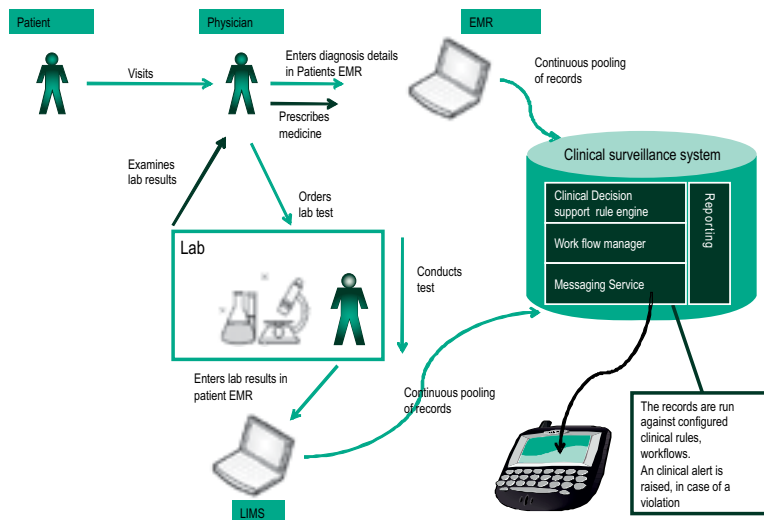
A real-time alert not only ensures clinical workflow compliance but also helps in achieving the performance measures set in P4P.

## What Then?

An alert and its escalation may lead to adjustment in medication dosage, intravenous infusions, ventilator support, and emergency procedures. These adjustments based on alerts

and escalations impact patient health outcomes. For instance, an appropriate medication alert is thrown up for evidence of adverse drug events such as worsening renal function or a decrease in urine output

in patients receiving antibiotics or other drugs associated with nephrotoxicity. Dose, allergy and interaction alerts can prevent adverse events, reduce length of stay and improve clinical outcomes.



## Acute Myocardial Infarction (Heart Attack)

KPI measured	Condition that triggers the alert	Action that can be taken to ensure compliance	Action that can be taken for missed action/ escalations
Acute Myocardial Infarction: Aspirin on arrival AMI-1	An actionable alert will be triggered if Aspirin is not given on arrival	Aspirin needs to be given as it is seen that early use of this drug reduces adverse events and mortality	An escalation if Aspirin is not administered on arrival reminding the treatment team to administer it quickly. It will help the treatment team document if Aspirin was withheld on purpose because a contraindication with the drug was found
Acute Myocardial Infarction: Administer ACEI or ARB for patients with AMI left ventricular systolic dysfunction during discharge AMI-3	An alert will be triggered if patient is not prescribed the above drugs before discharge	ACEI/ARB needs to be prescribed to AMI patients with left ventricular systolic dysfunction as it leads to reduction in morbidity and mortality	An escalation, which would help the treatment team ensure compliance. It will help document why the alert was missed and who was responsible for the missed action. Report for violation if escalation not heeded
Acute Myocardial Infarction: Prescribe beta blocker on discharge AMI-5	Alert will be triggered if patient is not prescribed the above drug before discharge	Beta blocker needs to be given as it leads to significant reduction in mortality and morbidity	An escalation if the medication is not prescribed after the alert. This would help the treatment team ensure compliance

An escalation alert enables treatment teams to re-examine a problem that was missed out due to oversight, negligence or excessive clinical work-load. An escalation can help document the missed alert and lead to greater accountability in the entire clinical process, as well as issue reminders on the tasks that need to be carried out.

### How Will IT Help?

A clinical surveillance system receives data from medication systems, laboratory systems and any medical devices attached to the patient. This real-time data when run against an automated rules engine provides information which can be used to generate clinical alerts. These alerts can prevent medical errors and help the treatment team respond to clinical events quickly. Realtime alerts, in a way, help hospitals adhere to Good Clinical Practice by improving real-time decision making.

### Pay for Performance measures for hospitals

The following table demonstrates with examples how clinical alerts can help hospitals comply with CMS performance

The screenshot shows a 'Patient Summary' table with columns for Patient ID, Date, and multiple clinical metrics. Each metric is represented by a colored bulb: green for informational, yellow for actionable, and red for non-compliance. Some bulbs have timers next to them, indicating time-dependent KPIs.

Patient ID	Date	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12
Patient Base Patient1	Apr 24	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Patient Base Patient2	Apr 22	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Patient Base Patient3	Apr 22	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Patient Base Patient4	Apr 22	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Patient Base Patient5	Apr 19	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Patient Base Patient6	Apr 20	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Patient Base Patient7	Apr 24	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green

measures. Key Performance Indicators (KPIs) based on CMS reports are used as examples below to initiate clinical alerts and ensure compliance with the process flow.

When a physician logs on to the clinical surveillance system, she can view the status of all his/her patients as depicted in the screen below. The system would also have sent alerts to the physician in the form of a text message or email as configured.

The alerts in this screen are classified into:

- Informational (green bulbs)
- Actionable (yellow bulbs)
- Non-compliance (red bulbs)

KPIs that are time-dependant have a timer displayed next to the bulb. A physician can look at the yellow bulbs and take corrective action at once to adhere to standard clinical workflow and thereby provide quality care to the patient. She can examine the reasons for non-compliance by going into the root cause in cases where a red bulb is indicated. The system provides details of non-compliance in the standard clinical pathway. A physician would need to learn from the root causes of non-compliance and try to eliminate these in future.

## CONCLUSION

Real-time alerts, set against performance measures, can improve the clinical decision-making process and reduce the complexity in scanning clinical information. Based on retrospective information, real-time alerts can reduce response time and help in accurate and timely clinical decision making. They can also help the various stakeholders improve the quality of care, according to practice guidelines and strengthen hospital quality initiatives. The heart of a real-time alert-led enhanced clinical workflow lies in being truly responsive to the needs of patients as they are the real customers. The chief benefit to hospitals is in terms of outcomes such as length of stay, criticality of an event, survival, and death. These outcomes can impact financial incentives and improve reimbursements in this era of Pay for Performance based on CMS measures.

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