



Clinical Decision Support Systems

Enhancing Healthcare Quality Through Intelligent Technology

Drug interaction alerts

Evidence-based guidelines

Lab test optimization

Risk score calculation



1. Drug Interaction Alerts

Alert Example



CRITICAL INTERACTION

Description

Drug interaction alert systems automatically screen prescribed medications against the patient's current medication list, identifying

Warfarin + Aspirin

⚡ High risk of bleeding complications



MODERATE INTERACTION

Metformin + Contrast Media



Monitor renal function closely

potential adverse interactions in real-time.

The system categorizes interactions by severity level (critical, major, moderate, minor) and provides actionable recommendations to clinicians before the prescription is finalized.

- ✓ Prevents adverse drug events
- ✓ Reduces medication errors by up to 50%
- ✓ Alerts for drug-allergy conflicts
- ✓ Considers patient-specific factors (age, renal function, etc.)
- ✓ Provides alternative medication suggestions



2. Evidence-Based Guidelines

Hypertension Management Pathway

Patient: BP \geq 140/90 mmHg



Description

Evidence-based guideline systems integrate the latest clinical practice guidelines from professional societies (ACC/AHA, ADA, ESC, etc.) directly into the clinical workflow.

These systems provide context-sensitive recommendations based on patient data, ensuring clinicians follow current best practices for

Diabetes or CKD present?

↓ YES

Start ACE-I or ARB



BP controlled after 4 weeks?

↓ NO

Add calcium channel blocker

diagnosis and treatment.

- ✓ Standardizes care across the organization
- ✓ Reduces practice variation
- ✓ Improves compliance with quality measures
- ✓ Updates automatically with new evidence
- ✓ Reduces time spent searching for guidelines
- ✓ Improves patient outcomes through best practices



3. Lab Test Optimization

Smart Lab Ordering

✓ Recommendation

HbA1c was checked 2 months ago (Result: 6.8%)

Description

Lab test optimization systems analyze ordering patterns, flag unnecessary or redundant tests, and suggest appropriate testing intervals based on clinical guidelines and patient history.

💡 Suggest: Recheck in 1 month instead of today

⚠️ Duplicate Alert

CBC already ordered for today at 08:30 AM

🕒 Cancel duplicate order?

✓ Cost Savings

Consider Basic Metabolic Panel instead of Comprehensive

💰 Saves \$45 | Clinical indication supports basic panel

The system considers previous test results, timing, clinical indication, and cost-effectiveness to reduce inappropriate laboratory utilization.

- ✓ Reduces unnecessary testing by 20-40%
- ✓ Prevents duplicate orders
- ✓ Suggests appropriate test timing
- ✓ Reduces healthcare costs significantly
- ✓ Minimizes patient discomfort from excess blood draws
- ✓ Improves resource utilization



4. Risk Score Calculation

10-Year Cardiovascular Risk (ASCVD)

Age: **55 years**

Total Cholesterol: **240 mg/dL**

Description

Risk score calculation systems automatically compute validated clinical risk scores using patient data from the EHR, eliminating manual calculation errors and saving clinician time.

Common risk scores include ASCVD (cardiovascular), CHADS2-VASc (stroke in atrial fibrillation), HAS-BLED (bleeding risk), Wells Score

HDL Cholesterol: **40 mg/dL**

Systolic BP: **150 mmHg**

Diabetes: **Yes**

Smoker: **Yes**

28.4%

HIGH RISK

Recommend: Statin therapy + lifestyle modification

(DVT/PE), and many others.

- ✓ Ensures accurate risk stratification
- ✓ Guides preventive interventions
- ✓ Supports shared decision-making with patients
- ✓ Triggers guideline-based recommendations
- ✓ Automatically recalculates with new data
- ✓ Improves preventive care delivery