

Lecture 17 - Contents

An overview of the main sections in this lecture.

Part 1

Emergency Medicine Case Studies

Part 2

Radiology Applications

Part 3

Clinical Workflows and Integration

Hands-on

Case Study Analysis

This outline is for guidance. Navigate the slides with the left/right arrow keys.

Lecture 17:

Real-World Case Studies

Medical AI in Practice: Real-World Success Stories

Case Study Collage, Hospital Logos

Case Studies Overview

Case Categories

Emergency Medicine

Radiology Applications

Clinical Trials & Drug Development

Population Health Management

Success Factors

- ✓ Clear definition of clinical problems
- ✓ Data quality and accessibility
- ✓ Close collaboration with healthcare professionals
- ✓ Gradual implementation and validation
- ✓ Continuous monitoring and improvement

Part 1/3:

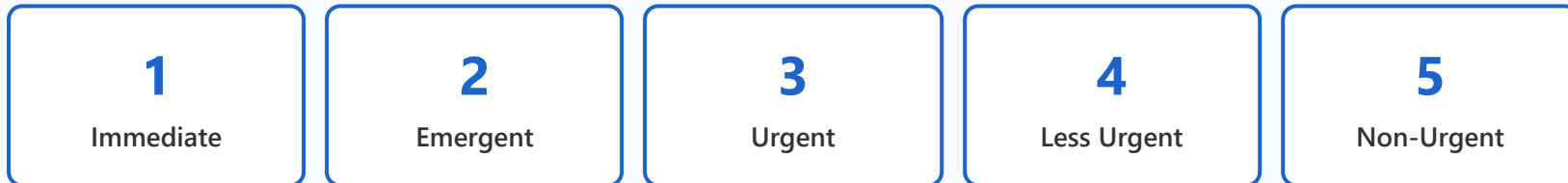
Emergency Medicine Applications

1. Emergency Department Triage System
2. Early Sepsis Prediction
3. Stroke Detection
4. Chest Pain Evaluation
5. Resource Allocation Optimization
6. Performance Metrics & Implementation Challenges

Emergency Department Triage System

ESI (Emergency Severity Index) Automation

Triage Flow



AI System Performance

- ▶ Accuracy: **92%**
- ▶ Processing Time: **30 sec reduction**
- ▶ Nurse Burden: **40% decrease**
- ▶ Mis-triage Rate: **5% improvement**

Key Features

- ▶ Real-time vital sign analysis
- ▶ Symptom-based priority determination
- ▶ Past medical record integration
- ▶ Healthcare staff final approval system

Early Sepsis Prediction

Prediction Model Input Features

Temperature	Heart Rate	Blood Pressure
Respiratory Rate	White Blood Cell Count (WBC)	Oxygen Saturation (SpO2)
Lactate Level	Urine Output	Consciousness Level (GCS)

ROC Curve Performance

AUC-ROC	0.89
Sensitivity	85%
Specificity	87%
Positive Predictive Value (PPV)	82%

Clinical Impact

Early Detection	4-6 hours
Mortality Reduction	15%
ICU Stay Reduction	2.3 days
Time to Antibiotics	1 hr faster

Alert System

- 🔔 Real-time risk score calculation
- 🔔 Automatic high-risk patient alerts
- 🔔 Mobile push notifications for healthcare staff

Stroke Detection

Automated CT Scan Analysis

Imaging Analysis Features

Hemorrhagic stroke detection

Ischemic stroke identification

Aneurysm detection

Lesion size measurement

ASPECTS score auto-calculation

Vessel occlusion location identification

AI Model Performance

Accuracy: 94%

Sensitivity: 96%

Specificity: 93%

Processing Time: <5 min

False Positive Rate: 3%

Comparable to neurologist



Time to Treatment Reduction

Diagnosis Time

15min

Thrombectomy Prep

30min

Total Treatment Start

45min

"Time is Brain" - 1.9 million neurons lost per minute of delay

Chest Pain Evaluation

Risk Stratification Algorithm

High Risk

Immediate cath lab prep
Emergency coronary angiography

Medium Risk

Intensive monitoring
Cardiac biomarker tracking

Low Risk

Outpatient follow-up
Early discharge possible

AI Assessment Results

Acute MI Detection Rate	98%
False Negative Rate	0.5%
Unnecessary Admission Reduction	30%
Assessment Time	10 min

Clinical Improvement

Early Diagnosis	2 hr faster
Unnecessary Tests	25% reduction
ED Length of Stay	1.5 hr reduction
Patient Satisfaction	15% increase

Resource Allocation Optimization

Allocation System Features



Bed Management

Real-time bed status tracking



Staff Allocation

Demand-based deployment



Ambulances

Optimal routing



Medication Inventory

Automatic demand forecasting



Lab Scheduling

Priority-based booking



OR Management

Time optimization

Efficiency Improvements

Bed Turnover Rate	+22%
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Wait Time Reduction	35 min
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Resource Utilization	85% → 95%
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Cost Savings

Operating Costs	-12%
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Overtime	-28%
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Inventory Waste	-15%
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Staff Allocation Optimization

+18%

Annual Savings

\$2.5M

Performance Metrics

Key Points

Feature 1

Feature 2

Feature 3

Results

Result 1

Result 2

Result 3

Implementation Challenges

Key Points

Feature 1

Feature 2

Feature 3

Results

Result 1

Result 2

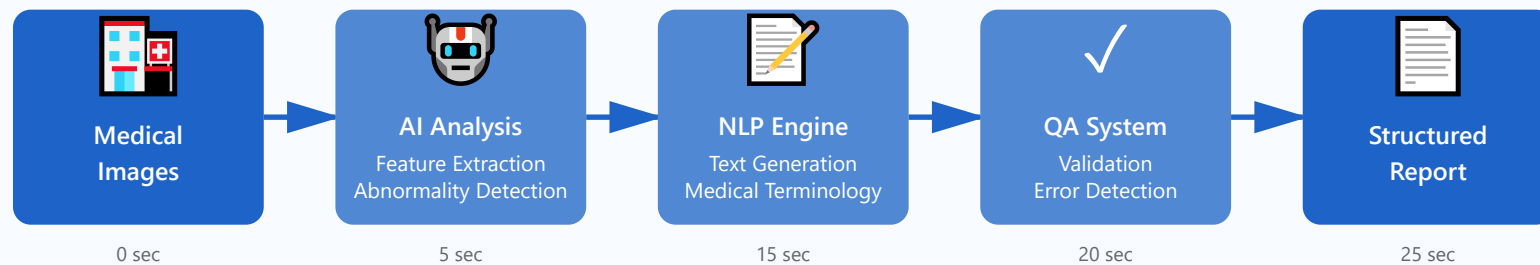
Result 3

Part 2/3:

Radiology AI Deployments

1. Automated Report Generation Pipeline
2. Finding Detection
3. Priority Queuing System
4. Quality Assurance
5. Radiologist Workflow Integration
6. PACS Integration

Automated Report Generation Pipeline



Processing Speed

25sec

Accuracy

96%

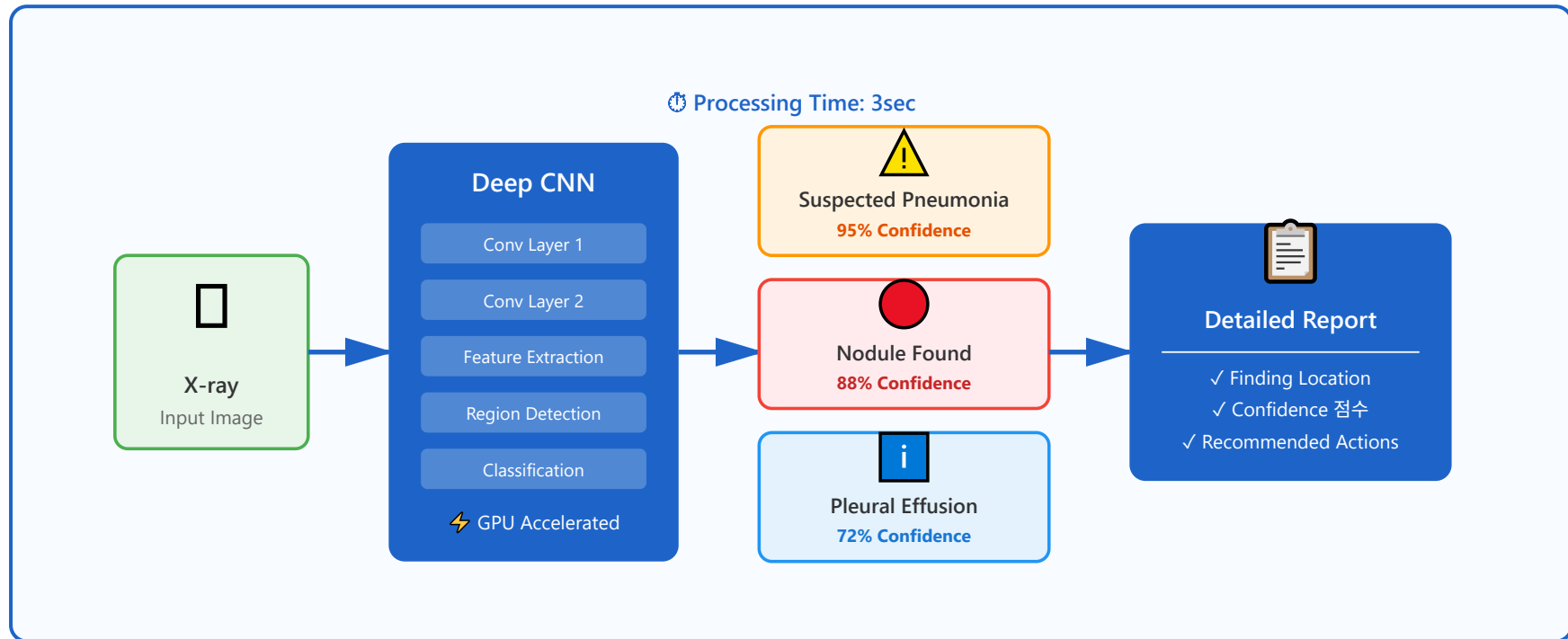
Time Saved

80%

Daily Throughput

500+

Finding Detection (Finding Detection)



검출 Accuracy

94%



Sensitivity

96%



Specificity

92%



Processing Speed



Daily Analysis



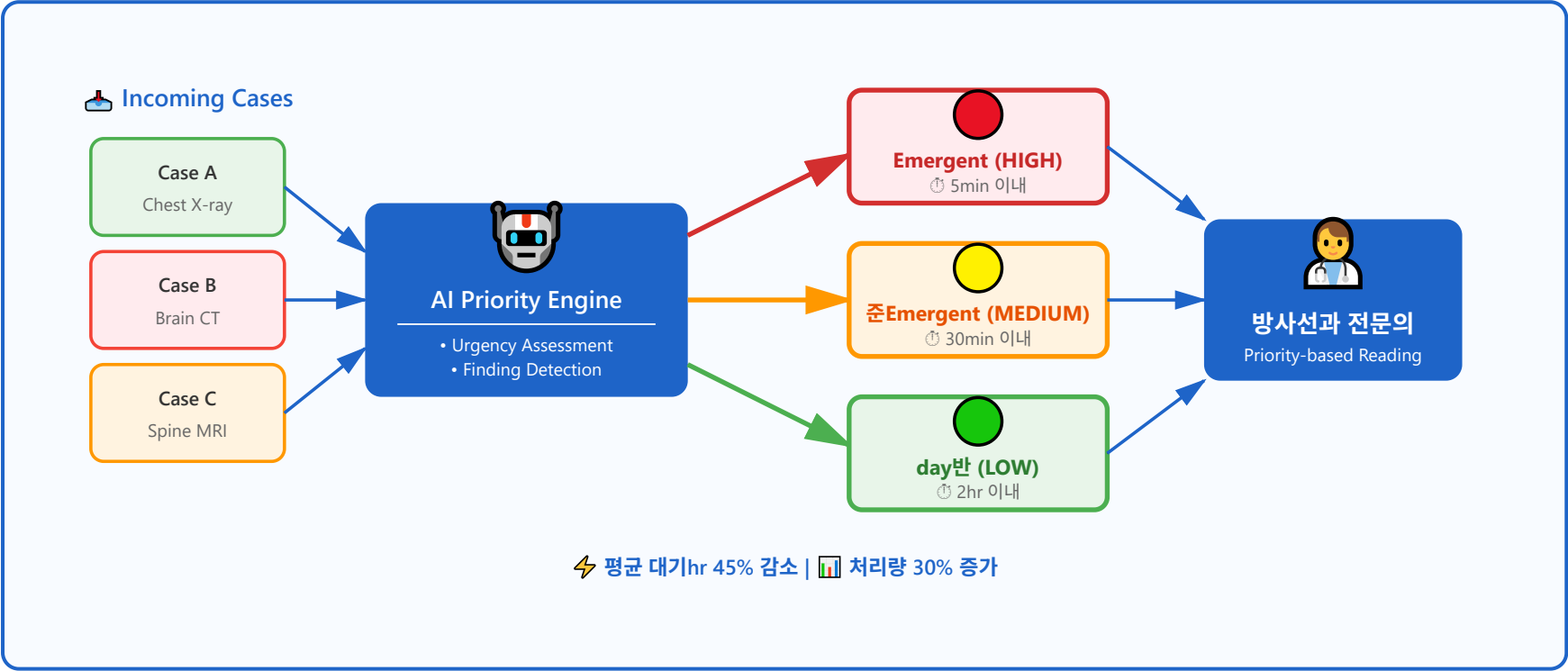
Detection Categories

3sec

1000+

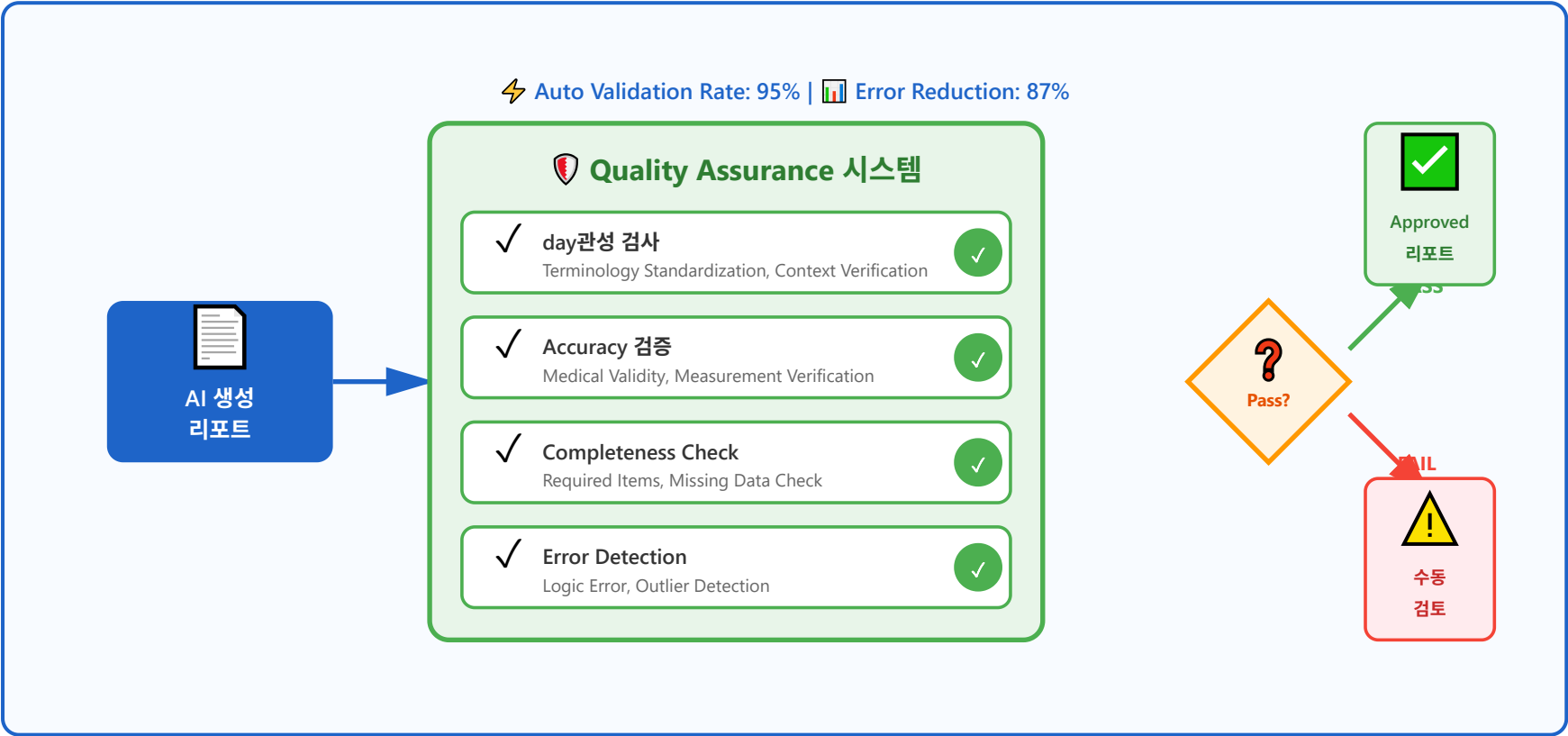
15+

Priority Queuing (Priority Queuing)



Wait Time Reduction	Throughput Increase	Urgent Case Processing	시스템 Accuracy
45%	30%	98%	91%

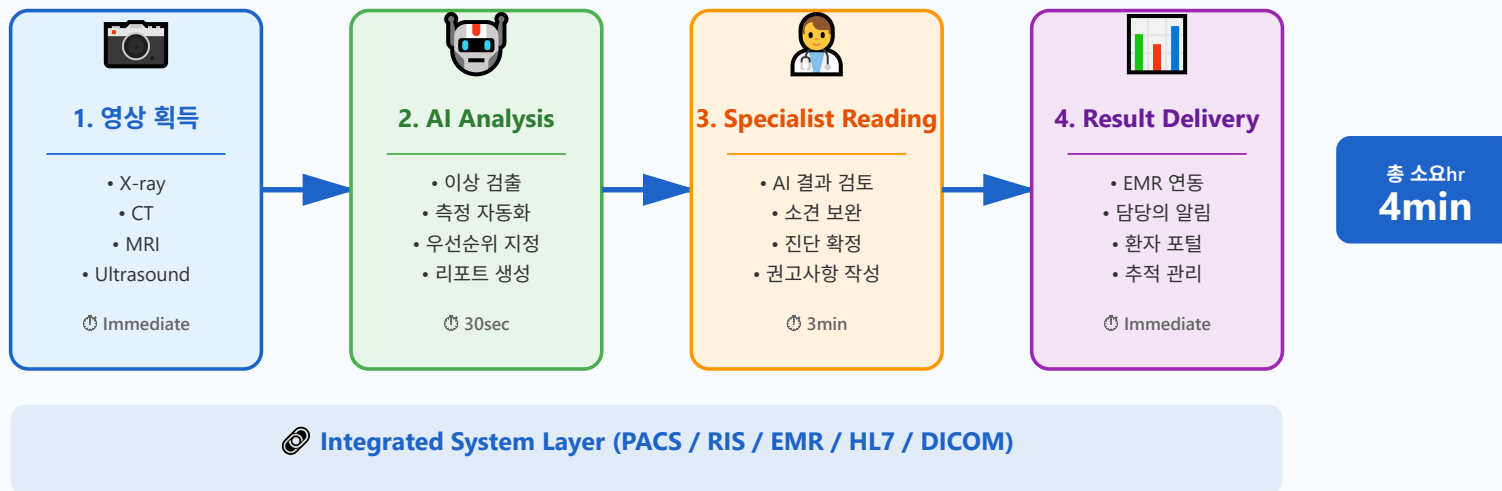
Quality Assurance (Quality Assurance)



Auto Validation Rate	Error Reduction	Processing Time	Manual Review Rate
95%	87%	2sec	5%

Radiologist Workflow Integration

⚡ Compared to Previous 65% Time Reduction | 📈 처리량 3x increase



Processing Time 단축

65%



Throughput Increase

3배



Accuracy 향상

12%



Physician Satisfaction

92%

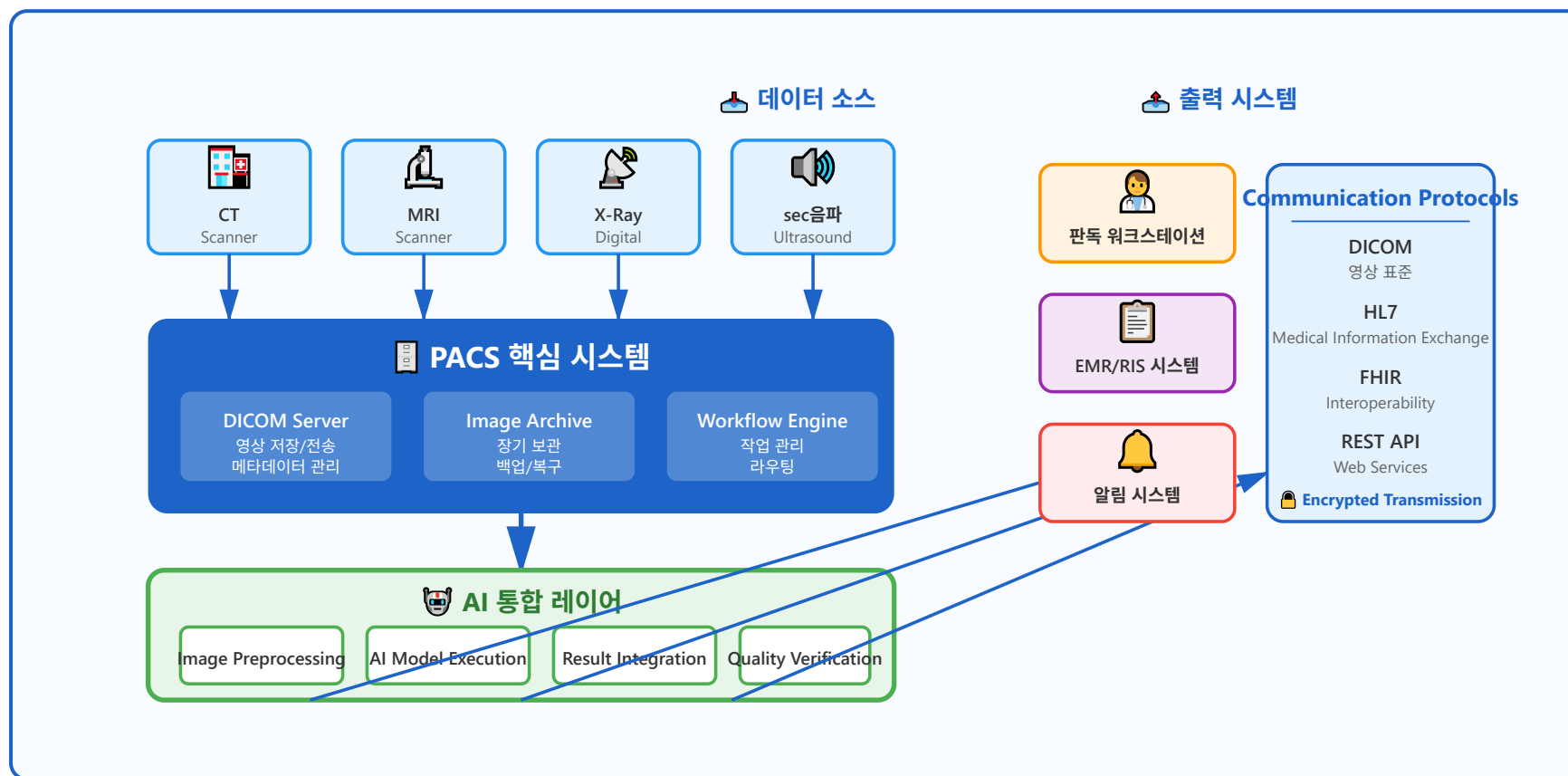
Misdiagnosis Reduction

28%

Cost Savings

35%

PACS Integration (PACS Integration)



실시간 처리



Auto Synchronization



Secure Communication



Integrated Dashboard



Auto Backup



Web Access



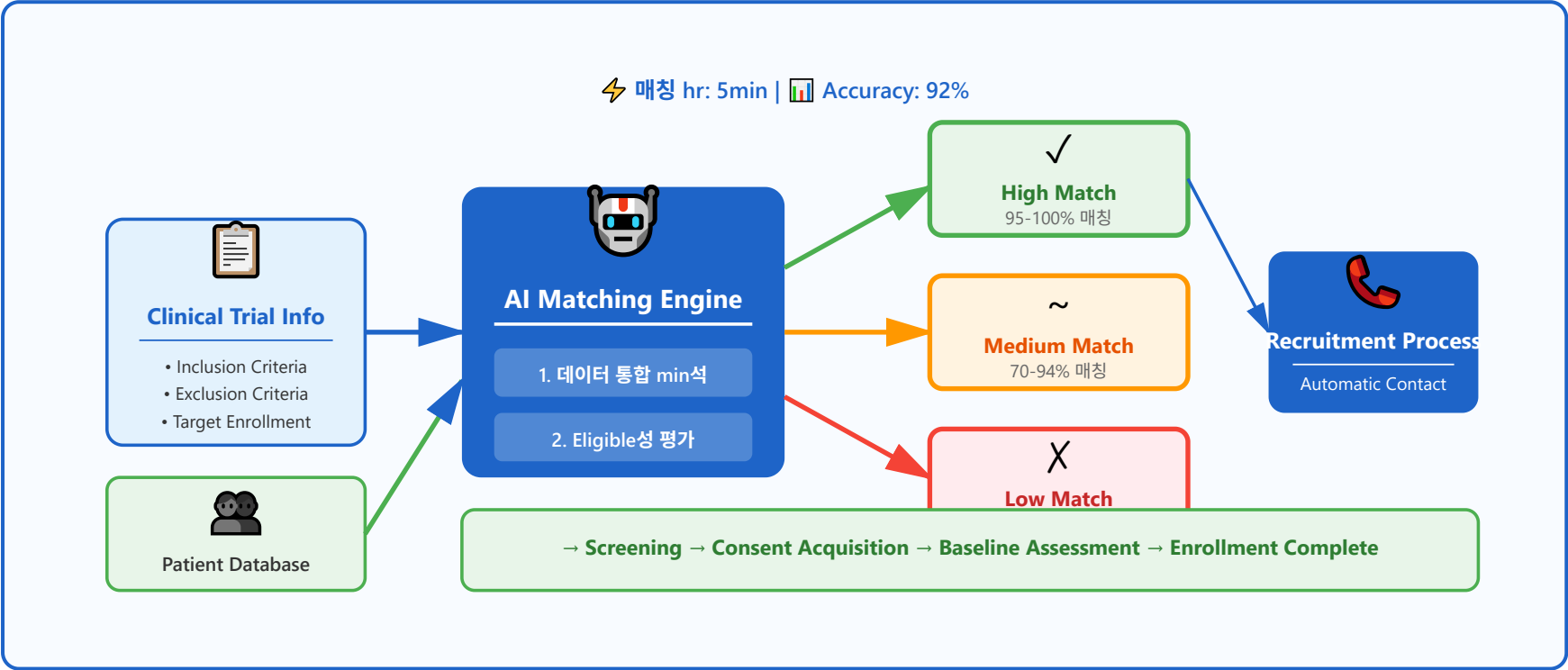
Standards Compliance

모바day 지원

Part 3/3:

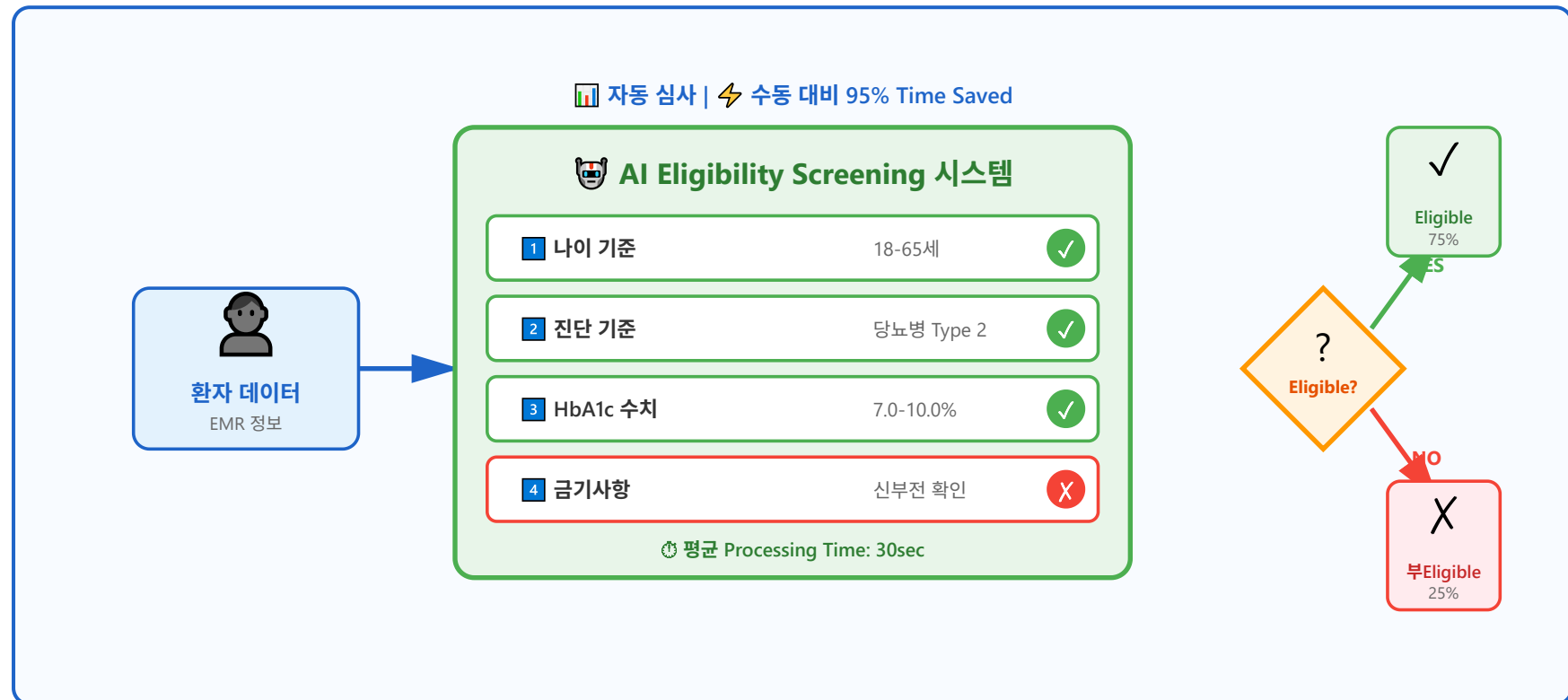
Clinical Trials and Drug Discovery

Patient Matching (Patient Matching)



매칭 Accuracy	Processing Time	Recruitment Speed Improvement	Cost Savings
92%	5min	3배	45%

Eligibility Screening (Eligibility Screening)



Processing Time

30sec

Accuracy

96%

Time Saved

95%

dayday 처리 건수

500+

Protocol Optimization

Key Points

Feature 1

Feature 2

Feature 3

Results

Result 1

Result 2

Result 3

Adverse Event Monitoring

Key Points

Feature 1

Feature 2

Feature 3

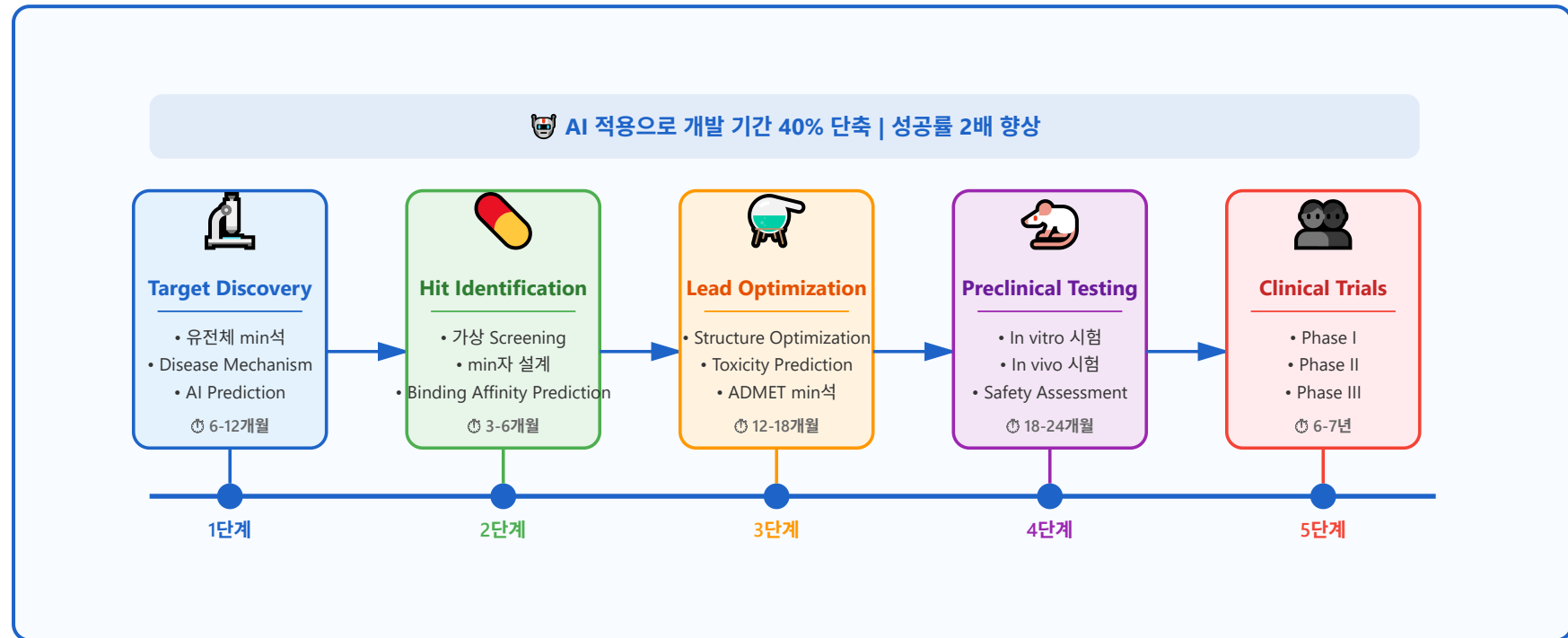
Results

Result 1

Result 2

Result 3

Drug Discovery Pipeline



Development Time Reduction

40%



Success Rate Improvement

2배



Cost Savings

30%



후보물질 Accuracy



Screening 속도



Toxicity Prediction Accuracy

85%

100배

90%

Target Identification

Key Points

Feature 1

Feature 2

Feature 3

Results

Result 1

Result 2

Result 3

Population Health Management

Key Points

Feature 1

Feature 2

Feature 3

Results

Result 1

Result 2

Result 3

Risk Stratification

Key Points

Feature 1

Feature 2

Feature 3

Results

Result 1

Result 2

Result 3

Lessons Learned

Key Points

Feature 1

Feature 2

Feature 3

Results

Result 1

Result 2

Result 3

Success Factors

Key Points

Feature 1

Feature 2

Feature 3

Results

Result 1

Result 2

Result 3

Future Opportunities

Key Points

Feature 1

Feature 2

Feature 3

Results

Result 1

Result 2

Result 3

Thank You

Real-World Case Studies in Medical AI