# SQL Optimization – Execution Plan Analysis

## 1. Queries Analyzed

Patients diagnosed in the last 6 months:  
  
SELECT p.Id, p.FirstName, p.LastName, p.City, p.Email, p.Phone  
FROM Patients p  
JOIN PatientConditions pc ON p.Id = pc.PatientId  
WHERE pc.DiagnosedDate >= DATEADD(MONTH, -6, GETDATE());

## 2. Execution Plan (Before Optimization)

- Clustered Index Scan on PatientConditions  
- Nested Loops join into Patients  
- High logical reads as entire PatientConditions table is scanned

## 3. Optimization Applied

Created a nonclustered index targeting DiagnosedDate to avoid full scan:  
  
CREATE NONCLUSTERED INDEX IX\_PatientConditions\_DiagnosedDate  
ON dbo.PatientConditions (DiagnosedDate)  
INCLUDE (PatientId);

## 4. Execution Plan (After Optimization)

- Index Seek on IX\_PatientConditions\_DiagnosedDate  
- Nested Loops join into Patients (Clustered Key Seek)  
- Significantly reduced logical reads and faster response time