



# Identifying Gaps in Care Using AI for Vertebral Body Compression Fracture Detection on Chest X-Rays

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## Introduction

Vertebral compression fractures (VCF) are often underreported as this is often not the purpose of the imaging examination. Identifying VCF is crucial for risk-stratifying patients for pharmacologic therapy in osteoporosis management. This retrospective study estimates the gap in care by estimating the incidence of missed VCF using AI as a subsequent reader.

## Hypothesis

VCF is underreported on posterior-anterior (PA) and lateral chest radiographs performed in routine clinical practice.

## Methods

An IRB-approved retrospective analysis of consecutive PA and lateral CXR exams (N = 16,066) was conducted using a commercially available FDA-cleared AI model for vertebral fracture detection. AI-flagged exams were classified as positive or negative for VCF. Radiology reports were analyzed using natural language processing (NLP) to determine whether VCF was reported. A board-certified radiologist reviewed the CXR images to establish the reference standard in a subset of discordant results (N=337). Exams were considered positive with mild, moderate, or severe VCF using the Genant classification. Counts and enhanced detection rates (absolute, ED<sub>Ra</sub>, and relative, ED<sub>Rr</sub>) were calculated.

## Results

The AI model flagged 13.2% (2,134/16,066) exams for VCF, of which 79.4% (1,695/2,134) were discordant with the radiology reports. 1.48% (237/16,066) exams were positive for VCF but missed by AI. In the subset of exams reviewed by a board-certified radiologist, the incidence of VCF was 9.6% (199/2,072). VCF was only reported in 30.1% (60/199) of exams and VCF was not reported in 69.8% (139/199) of confirmed VCF. The ED<sub>Ra</sub> and ED<sub>Rr</sub> of VCF was 6.7% (139/2,072) and 231% (139/60) respectively.

## Conclusion

VCF is underreported on CXRs, and AI has the potential to close gaps in care for population health interventions. Further investigation is needed to stratify these results by clinically significant VCF with moderate to severe compression fractures which require further workup and management.

## Keywords

Applications; Artificial Intelligence/Machine Learning; Clinical Workflow & Productivity; Imaging Research; Quality Improvement & Quality Assurance