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How does an AI diagnose dyspnoea in ED triage without human guidance?

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2024

Document Version:
Publisher's PDF, also known as Version of record

Link to publication

Citation for published version (APA):
Tolestam Heyman, E., Ashfaq, A., Ekelund, U., Ohlsson, M., Björk, J., Khoshnood, A. M., & Lingman, M. (2024). *How does an AI diagnose dyspnoea in ED triage without human guidance?*. Poster session presented at Swedish Emergency Medicine Talks - SWEETS24, Göteborg, Sweden.

Total number of authors:
7

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Download date: 16. Nov. 2026

How does an AI diagnose dyspnoea in ED triage without human guidance?

Background & Aim

• Half of adults with emergency department (ED) complaint dyspnoea suffer from acute heart failure (AHF), exacerbation of chronic obstructive pulmonary disease (eCOPD) or pneumonia.

• These diagnoses are difficult to make initially in the ED visit, therefore many patients get improper ED treatment.

• Our aim was to explore important variables to an artificial intelligence (AI) when classifying dyspnoeic adult ED visits into AHF, eCOPD, pneumonia or other diagnoses at time of ED triage.

Method

• All adult visits with complaint dyspnoea at a Swedish region´s two EDs.

• The AI was presented to all accessible, unselected patient-generated data from the complete regional health care system within one year prior to the ED visit.

• Data included diagnostic and procedure codes, complaints, medications, vital signs, blood tests, referrals and ECGs. Free text and images were not included.

• The patient´s socioeconomic factors, such as education and income, were also presented to the AI.

• We analysed by using the AI model recurrent neural networks.

• The model picked up only predictive variables and discarded the rest as noise. It identified complex multidimensional relationships.

Result

• AHF, eCOPD and pneumonia made up 15%, 14% and 13% of the 10,875 visits, respectively.

• The AI found 1,870 predictive variables and discarded the rest. It made a variable list in order of diagnostic importance.

• On top were a previous diagnosis of heart failure, ECG presenting atrial fibrillation, COPD as primary care complaint and picked-up medication for obstructive airways.

• Overall, diagnosis, medication, age and ECG were used while sex, vital signs and socioeconomic factors were ignored.

• As a surprise, picked-up veterinary medication was relatively predictive.

Discussion

• We aimed to capture possible insights from an AI diagnosing without human guidance.

• We believe the result mainly aligns with previous knowledge. Though, vital signs and sex did not aid the AI diagnostics.

• Having a pet on medication may have some diagnostic value.

It uses age, ECGs, prior diagnoses and medication – but not sex, vital signs or socioeconomic factors

Scan for more methodology and a Top 300 AI-list:

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