ECBC Clinical Resource Development

Adult Seasonal Respiratory Illness Toolkit & LLMs in EM

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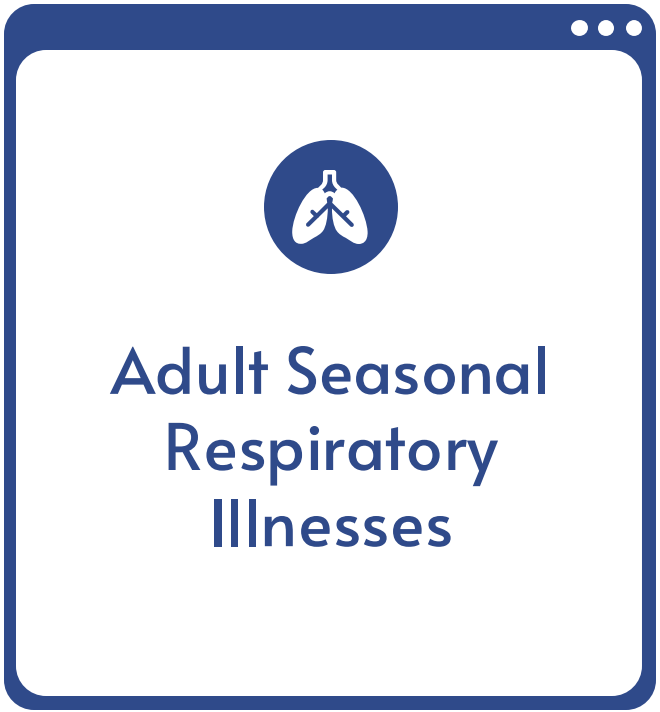
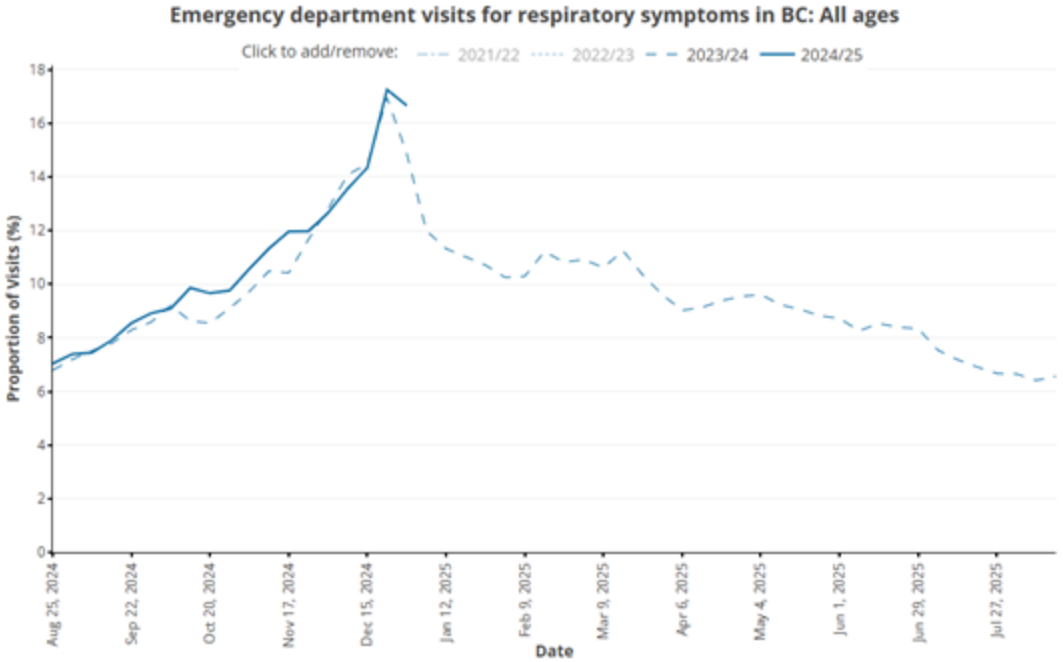

Adult Seasonal Respiratory Illnesses


Large Language Models in Emergency Medicine

Adult Seasonal Respiratory Illnesses

A clinical toolkit for frontline providers in the Emergency Department

ED Visits in BC



https://bccdc.shinyapps.io/respiratory_syndromic/

Respiratory Season

November to April
Peaks in late December

ED Visits

17.25% of ED visits of late December 2024 were for respiratory concerns

Seasonal Respiratory Illnesses

- COVID-19 & Influenza
- Enterovirus/Rhinovirus & RSV
- Asthma
- COPD
- Bronchiectasis

Seasonal Respiratory Illness Resources

- Health Authority Resources
  - First Nations Health Authority: Holiday Season is Also Flu Season
  - Fraser Health - Influenza
  - Interior Health – Respiratory Season
  - Island Health - Influenza
  - Northern Health – Influenza and Immunizations
  - Vancouver Coastal Health - Cold and Influenza
- ECBC Resources:
  - Influenza & RSV
  - Asthma Exacerbation: Diagnosis and Treatment,
  - COPD: Diagnosis and Treatment
  - Bronchiectasis: Diagnosis and Treatment
    Community Acquired Pneumonia: Diagnosis and Treatment
- Other Resources
  - Health Canada – Influenza for Health Professionals
  - NEW: NACI - Statement on Seasonal Influenza Vaccine 2024-2025
  - Immunize Canada information on RSV, Influenza, and COVID-19
  - Smoking Cessation: CAMH Toolkit for Smoking Cessation & BC's Smoking Cessation Program

Patient & Family Resources

- ECBC Patient Information Resources: Cough & Colds, COVID-19, and Influenza,
- Government of British Columbia: Healthy Habits for Respiratory Season
- HealthLink BC: Learn about Colds and Flu
- COVID-19 Self-Assessment Tool: Answer some questions about your symptoms and see if a test is recommended
- 8-1-1 HealthLink BC: Families can speak to a registered nurse any time, every day of the year.
- Quitnow.ca is a great resource for patients from BC looking to quit smoking.

Take Homes

Patient Education

Reinforcement of responsible ED use and provision of illness materials

Immunization & Vaccination

Education and encouragement of immunizations

Lifestyle Factors

Encourage hand hygiene and smoking cessation practices

Large Language Models in Emergency Medicine

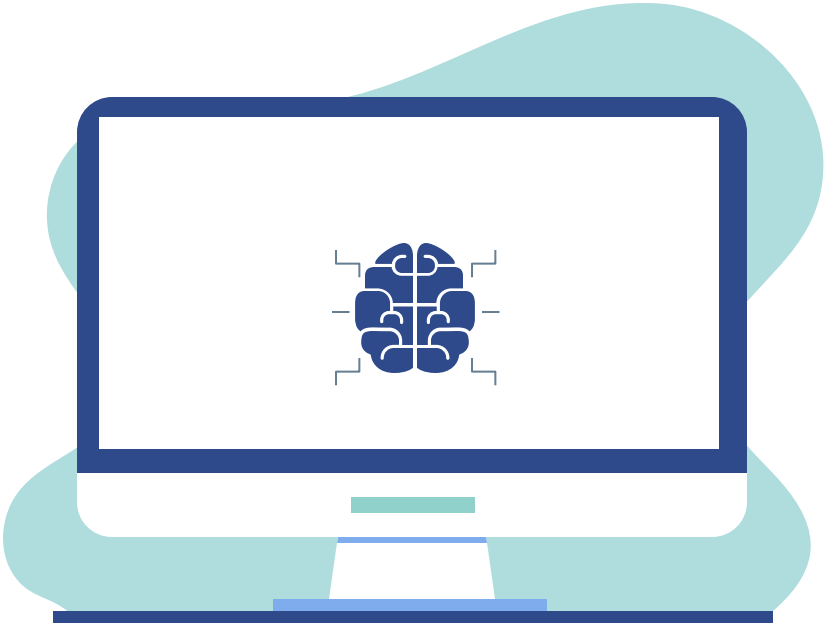
A Literature Review

What are Large Language Models?

- Large Language Models are AI systems designed to understand and generate human language.
- Trained on extensive textual data sets.
- Proficient in unstructured data management and real-time data processing.

Biomedical Large Language Models

- ChatGPT (GPT-4o, GPT-4, & GPT-3.5)
- MedPaLM & MedPaLM 2
- PMC-LLaMa
- BERT & T5



LLMs in Emergency Medicine

- Prehospital & Triage
  - Babylon Triage (80.0% AI sensitivity and 83.9% physician sensitivity, 97.0% AI safety rating and 93.1% physician safety rating)
  - KATE (27% higher accuracy in triage than the average nurse)
- Clinical Decision Making
  - Clinical Test Interpretation: Mammography, Diabetic Retinopathy, Fracture, Intracranial Hemorrhage
  - Outcome Prediction: COVID-19 Assessment, Suicide Risk, Hospitalization likeliness, Cardiac Arrest
- Discharge and Documentation
  - Ambient transcription services
  - AI-assisted discharge documentation generation

LLMs in Knowledge Translation

- Diabetic Ketoacidosis (Hamed et al., 2024)
  - GPT-4 & RAG with UK, Canadian & Australian DKA guidelines. “The AI model successfully provided relevant and accurate clinical answers based on the analyzed guidelines…”
- Chronic Hepatitis C Management (Kresevic et al., 2024)
  - GPT-4 & RAG with European and NA HCV Guidelines. Generated responses to HCV management with 99% accuracy.
- Non Small-Cell Lung Cancer (Gupta et al., 2024)
  - GPT 3.5 Turbo & RAG with National Comprehensive Cancer Network Guidelines. 88.47% accuracy in generated content

Risks, Barriers and Ethical Concerns

- Dataset Inaccuracy & Bias
- AI “Hallucination”
- Transparency and the “Black Box” Problem

Considerations for ECBC

- Static Resource Development
    - Clinical toolkit and resource development using LLMs and RAG with ECBC and associated HIN materials for emergency medicine topics
- AI Chatbot
    - An AI-powered chatbot utilizing ECBC and associated HIN materials to answer clinical inquiries of frontline providers

Questions?

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