Diagnosing Pneumonia with AI

Children aged < 5 years with pneumonia symptoms taken to a healthcare provider (%)-GHO

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Motivation

Why

AI is a powerful tool. If we can improve healthcare services, we should.

How

Image recognition is just one area of AI but is being used in analysis of x-rays and CAT scans with great success[1,2]

[1] McKinney, S.M., Sieniek, M., Godbole, V. *et al.* International evaluation of an AI system for breast cancer screening. *Nature* 577, 89–94 (2020) doi:10.1038/s41586-019-1799-6

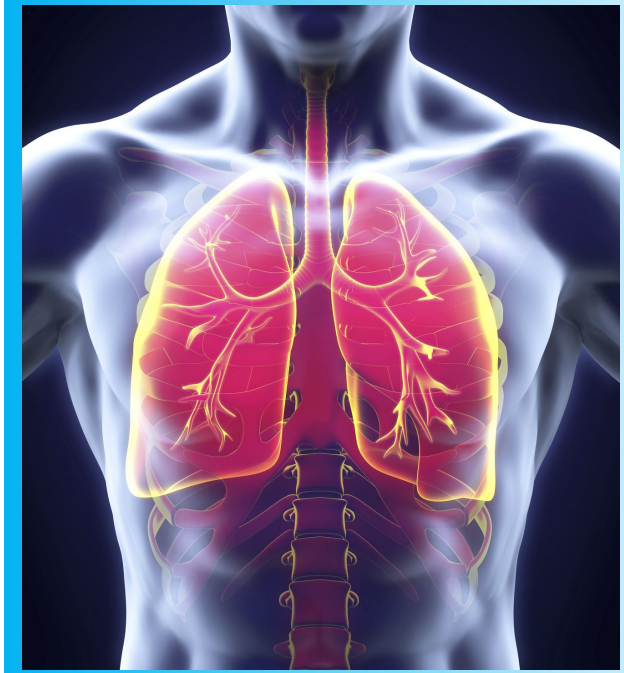
[2] B. Parmadean et al. Transfer Learning from Chest X-Ray Pre-trained Convolutional Neural Network for Learning Mammogram Data, (Procedia Computer Science Volume 135, 2018, Pages 400-407) https://doi.org/10.1016/j.procs.2018.08.190

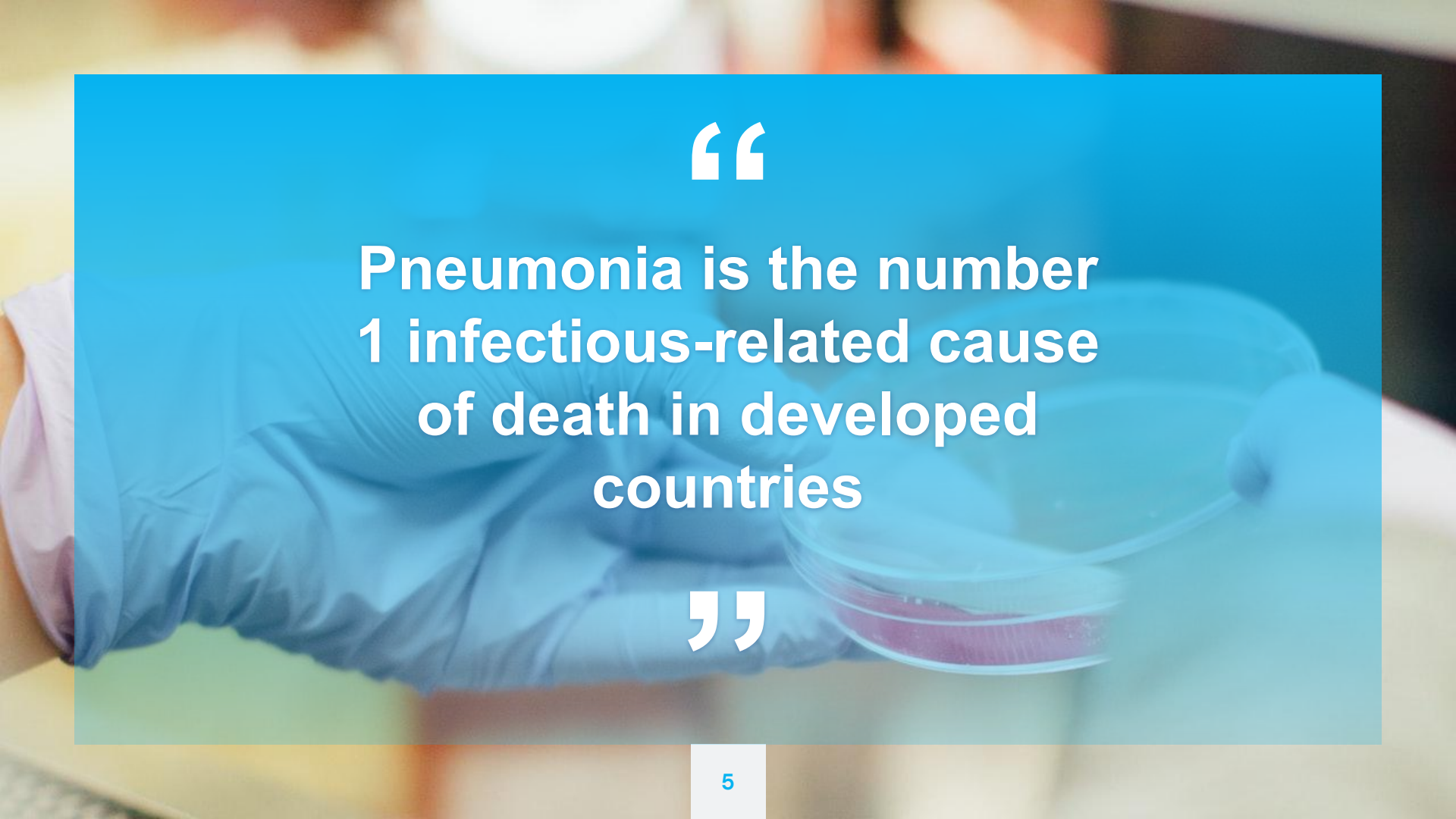
What is Pneumonia?

- Lungs are made up of small air filled sacs, called alveoli.

- Pneumonia causes these alveoli in the lungs to fill up with fluid.

Accounts for 15% of deaths in children aged <5 years worldwide. (808,694 deaths in 2017)





“Pneumonia is the number 1 infectious-related cause of death in developed countries”

Diagnoses & Treatment

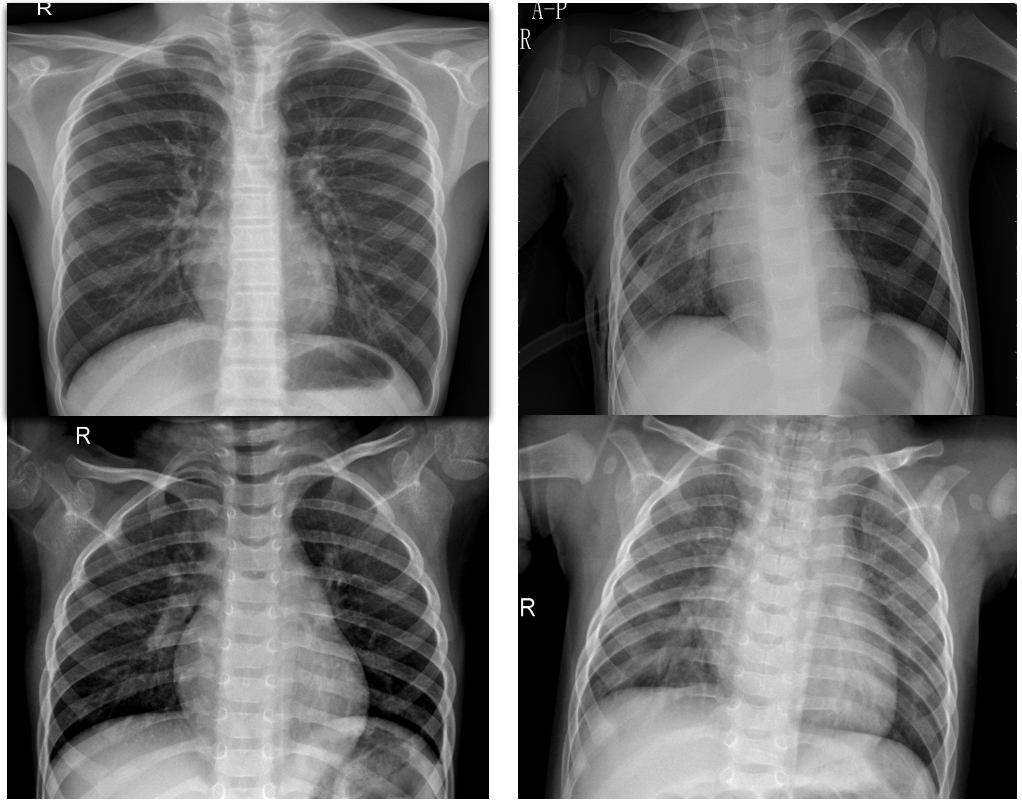
- Main types of Pneumonia: Bacterial, Viral.
- Other causes of Pneumonia-like symptoms discovered through failure of treatment.

↑ Diagnoses Time = ↑ Mortality Rate

AI for Image Recognition

Can neural networks be used for diagnoses?

Can you tell the difference?



Healthy Pneumonia

98% Sick Patients
Correctly Diagnosed

86% Healthy Patients
Correctly Diagnosed

95%
Overall Accuracy

Benefits

- Saves time and resources.
- Higher overall accuracy than traditional diagnosis methods.
- Potential for diagnosing other diseases.

We can improve diagnoses speed and reduce mortality rates.

Thanks!

Any questions?

Credits

Special thanks to all the people who made and released these awesome resources for free:

- Presentation template by SlidesCarnival
- Photographs by Unsplash

Find the notebook at: https://github.com/