

Popular science summary of the PhD thesis

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Title of the PhD thesis	<u>Deep learning methods for pediatric middle ear diagnostics</u>
PhD school/Department	<u>DTU Compute</u>

Science summary

Middle ear infection, also called otitis media, is extremely common in children with around 80% having a case before school age. If left untreated, the majority of cases of otitis media resolve themselves within 3 months. However, the presence of fluid in the middle ear for that length of time can still significantly affect the child. Untreated, delayed treatment or persistent episodes can have consequences for the development of a child's auditory and vestibular system, leading to hearing loss, delays in language acquisition, poor school performance, and behavioral problems.

Treatment for otitis media is highly debated in the medical literature, due to the high increase in recent years of drug-resistant infections in acute otitis media. Historically, there has been a global tendency to over-prescribe antibiotics in cases where middle ear effusion is present, but it is not clear if there is infection. This, along with the usual high prevalence of not fully adhering to a full course of antibiotics and the very high general prevalence of otitis media in young children, has led to a rise in drug resistant bacteria and the desire to reduce general antibiotic use. In order to reduce the use of antibiotics, the diagnosis of otitis media needs to be improved.

Deep learning is widely used in medical image analysis, and have shown great capabilities in computer-aided diagnostic systems. This PhD project aims to determine if it is possible to automate the diagnosis of otitis media using deep learning. The goal is to provide a diagnostic model for the subclassification of otitis media with effusion and acute otitis media based on otoscopy images of the eardrum and wideband tympanometry measurements. These methods could potentially be used as a diagnostic tool to assist medical professionals in the assessment of the status of the eardrum, and thus improve the diagnosis and treatment of otitis media in the future.

Please email the summary to the PhD secretary at the department