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Vaccine has cut child cases of bacterial pneumonia, says study

The number of children admitted to English hospitals with bacterial pneumonia decreased by a fifth in the 2 years following the introduction of a vaccine to combat the disease

The number of children admitted to English hospitals with bacterial pneumonia decreased by a fifth in the two years following the introduction of a vaccine to combat the disease, according to a new study published today in the journal *Thorax*.

Bacterial pneumonia is a serious illness caused by *Streptococcus pneumoniae* bacteria that mostly affects babies, young children and elderly people. In Europe, around one in ten deaths in the under-fives is caused by the disease.

Bacterial pneumonia usually develops as a complication following a respiratory tract infection such as influenza. Symptoms include difficulty breathing, wheezing, fever and loss of appetite.

In September 2006, a vaccine known as PCV7 was introduced into the childhood primary immunisation programme across the UK, to protect against seven different strains of *Streptococcus pneumoniae* bacteria.

Today's study, led by researchers from Imperial College London, shows that in the first two years following the introduction of this vaccine, hospital admissions for bacterial pneumonia decreased by 19 per cent amongst children aged under 15 years. Admissions for empyema, a rare and serious complication of bacterial pneumonia, decreased by 22 per cent.

The pneumococcal vaccine is administered at two, three and 13 months of age. When it was first introduced there was a catch-up campaign for children up to two years. Take-up of the vaccine over the study period was high. It was administered to an average of 84 per cent of eligible children in England in the first year following its introduction and 91 per cent the following year.

Dr Sonia Saxena, who led the study from the School of Public Health at Imperial College London and works as a GP in South London, said: "It's a frightening experience for everyone involved when your child becomes unwell and very disruptive to families if they need to be admitted to hospital, so we're really pleased that the number of children becoming seriously unwell and needing admission to hospital with bacterial pneumonia and empyema has fallen since the vaccination programme was introduced. In addition, it's great that such a large proportion of parents chose to have their child vaccinated over the period we were studying. The success of any vaccination programme depends on vaccinating as many people as possible. Now that we have clear evidence about the benefits of the pneumonia vaccine, we hope more parents will be encouraged to have their children vaccinated in future."

The study showed that the number of older children admitted with bacterial pneumonia decreased, as well as the number of younger children, following introduction of the vaccine. This result suggests that vaccinating young children against bacterial pneumonia also provides protection for older, non-vaccinated children, providing 'herd immunity' by slowing the spread of disease.

The PCV7 vaccine was introduced in England after hospital admission rates for bacterial pneumonia and empyema increased by 31 per cent and 260 per cent respectively, between 1997 and 2006, amongst children aged under 15 years. The reasons for this increase are unclear. Prior to the introduction of PCV7, there were 13,771 hospital admissions for bacterial pneumonia among children under 15 years in 2005.

The PCV7 vaccine has now been replaced with a newer pneumococcal vaccine called PCV13, which works in the same way as PCV7 but protects against more strains of *Streptococcus pneumoniae* bacteria. There are around 90 strains of this bacteria and around a quarter of cases are caused by strains not covered by PCV13.

Joanna Murray, a co-author of the study, also from the School of Public Health at Imperial College London, added: "Our study looked at a two year period since the introduction of PCV7. We are keen to see whether there continues to be a decrease in the number of cases, which is what we are hoping. Our results are encouraging, but even with a vaccination programme in place bacterial pneumonia remains an important cause of morbidity and mortality among children. Scientists are working to develop even better vaccines that can protect against more strains of *Streptococcus pneumoniae* bacteria and protect even more people."

The study was funded by the National Institute for Health Research, the Medical Research Council and the Engineering and Physical Sciences Research Council.

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Notes to editors:

1. E. Koshy et al. Impact of the seven-valent pneumococcal conjugate vaccination (PCV7) programme on childhood hospital admissions for bacterial pneumonia and empyema in England: national time-trends study, 1997-2008. *Thorax*, September 2010.

A copy of the full paper can be downloaded at:

https://fileexchange.imperial.ac.uk/files/43f83d242db/THORAX_Koshy%20et%20al%202010.pdf

2. About Imperial College London

Consistently rated amongst the world's best universities, Imperial College London is a science-based institution with a reputation for excellence in teaching and research that attracts 14,000 students and 6,000 staff of the highest international quality. Innovative research at the College explores the interface between science, medicine, engineering and business, delivering practical solutions that improve quality of life and the environment - underpinned by a dynamic enterprise culture.

Since its foundation in 1907, Imperial's contributions to society have included the discovery of penicillin, the development of holography and the foundations of fibre optics. This commitment to the application of research for the benefit of all continues today, with current focuses including interdisciplinary collaborations to improve global health, tackle climate change, develop sustainable sources of energy and address security challenges.

In 2007, Imperial College London and Imperial College Healthcare NHS Trust formed the UK's first Academic Health Science Centre. This unique partnership aims to improve the quality of life of patients and populations by taking new discoveries and translating them into new therapies as quickly as possible.

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