

STREPTOCOCCUS PNEUMONIAE IN
COMMUNITY ACQUIRED PNEUMONIA IN
INFANTS AND CHILDREN LESS THAN FIVE
YEARS OLD

Thesis

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In Pediatrics*

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List of Abbreviations

μL:	Microliter
AAP:	American Academy of Pediatrics
ACIP:	Advisory Committee for Immunization Practices
ADH:	Antidiuretic hormone
AOM:	Acute otitis media
BAL:	Bronchoalveolar lavage
C. pneumoniae:	Chlamydia pneumoniae
CAP:	Community acquired pneumonia
CBC:	Complete blood count
CbpA:	Choline binding protein A
CDC:	Centers for Disease Control and Prevention
CHD:	Congenital heart disease
CNS:	Central nervous system
CRP:	C-reactive protein
CSF:	Cerebro-spinal fluid
CT:	Computed tomography
CXR:	Chest x-ray
DNA:	Deoxyribonucleic acid
E.coli:	Escherichia coli
ET:	Endotracheal
FiO₂:	Fraction of inspired oxygen
GERD:	Gastro-oesophageal reflux disease
H. influenzae:	Haemophilus influenzae
Hib:	Haemophilus influenzae type b
lb:	Pound
ICU:	Intensive care unit
IgA:	Immunoglobulin A
IgG:	Immunoglobulin G
IgM:	Immunoglobulin M

IL:	Interleukin
IL-1:	Interleukin 1
IM:	Intramuscular
IV:	Intravenous
Kg:	Kilogram
L:	Liter
M. pnemoniae:	Mycoplasma pnemoniae
mg:	milligram
MRSA:	Mecithillin resistant Staphylococcus aureus
°C:	Degree centigrade (celcius)
PaCO₂:	Pressure of arterial carbon dioxide
PAF:	Platelet activating factor
PCAP:	Pediatric community acquired pneumonia
PCR:	Polymerase chain reaction
PSPA:	Pneumonococcal surface protein A
RSV:	Respiratory syncytial virus
S. pneumoniae:	Streptococcus pneumoniae
SaO₂:	Arterial oxygen saturation
SP:	Streptococcus pneumoniae
SPSS:	Statistical package of social science
TLC:	Total leucocytic count
UK:	United Kingdom
US:	United States
USA:	United States of America
WBC:	White blood cell
WHO:	World Health Organization

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Introduction

The term "community-acquired pneumonia" (CAP) refers to a pneumonia in a previously healthy person who acquired the infection outside a hospital. CAP is one of the most common serious infections in children, with an incidence of 34 to 40 cases per 1000 children in Europe and North America (*Jokinen, et al., 1993 and British Thoracic Society Standards of Care Committee, 2002*). It is to be mentioned that lower respiratory tract infection is one of the leading causes of childhood mortality in developing countries (*Redd et al., 1994 and Boschi-Pinto and Debay, 2004*).

Many studies were carried out to delineate the most common causative organisms in bacterial pneumonias among pediatric age groups. *Streptococcus pneumoniae* (SP) is the most common bacterial cause of CAP after the neonatal period (*Principi and Esposito, 2002*).

Streptococcus pneumoniae is a gram positive, lancet-shaped, encapsulated diplococcus, occurring occasionally as individual cocci or in chains. Ninety serotypes have been identified by type-specific capsular polysaccharides. *Streptococcus pneumoniae*, or pneumococcus, frequently colonizes the upper respiratory tract and may cause upper respiratory tract infection (e.g., otitis media, sinusitis) or invasive disease (e.g., pneumonia, bacteremia, meningitis). *Streptococcus pneumoniae* is the most common cause of

bacterial community-acquired pneumonia and otitis media and the second most common cause of meningitis in children (*Behrman et al., 2004a*).

In February 2000, a new heptavalent pneumococcal vaccine was licensed for use in the United States. This vaccine produces immunity for the seven most common disease-producing serotypes of *Streptococcus pneumoniae* in children. Widespread use of this vaccine is expected to decrease incidence of invasive pneumococcal disease dramatically (*Black et al., 2000 and McIntosh, 2002*).

Recent data from ongoing meningitis surveillance in Egypt revealed that 47% of *Streptococcus pneumoniae* strains from cerebro-spinal fluid were non-conjugate vaccine serotypes (*Abdel-Maksoud et al., 2004*). Minimal data currently exist on the proportion of community-acquired pneumonia caused by *Streptococcus Pneumoniae*, and on the distribution of various serotypes of *Streptococcus pneumoniae* in the Middle East.

Aim of the Work

The aim of the present work is to study the magnitude of *Streptococcus pneumoniae* infections in the problem of community-acquired pneumonia among infants and children below the age of 5 years, to describe the clinical characteristics of *Streptococcus pneumoniae* infection in this age group and to identify the distribution of various serotypes of *Streptococcus pneumoniae* in Egypt.

Community Acquired Pneumonia

Definition:

The term "community-acquired pneumonia" (CAP) refers to a pneumonia in a previously healthy person who acquired the infection outside a hospital (*Jokinen et al., 1993 and British Thoracic Society Standards of Care Committee, 2002*).

Incidence and mortality:

CAP is one of the most common serious infections in children, with an incidence of 34 to 40 cases per 1,000 children in Europe and North America (*British Thoracic Society Standards of Care Committee, 2002; Gaston, 2002 and McIntosh, 2002*), which is a higher rate than at any other time in life apart from populations aged 75 years and over (*McIntosh, 2002*). Although death from CAP is rare in industrialized countries, lower respiratory tract infection is one of the leading causes of childhood mortality in developing countries (*Redd et al., 1994; Baltimore, 2002a and Boschi-Pinto and Debay, 2004*).

Etiology:

Determining the cause of pneumonia in a child is often difficult; the lung itself is rarely sampled directly, and sputum representing lower-airway secretions can rarely be obtained from children. In addition, culture of secretions from the upper respiratory tract is not useful, since the normal flora includes