

# Community-acquired sepsis-like syndrome and paediatric acute respiratory tract infection in childhood study

<b>Submission date</b> 10/08/2016	<b>Recruitment status</b> No longer recruiting	<input type="checkbox"/> Prospectively registered <input type="checkbox"/> Protocol
<b>Registration date</b> 30/08/2016	<b>Overall study status</b> Completed	<input type="checkbox"/> Statistical analysis plan <input type="checkbox"/> Results
<b>Last Edited</b> 30/08/2016	<b>Condition category</b> Infections and Infestations	<input type="checkbox"/> Individual participant data <input type="checkbox"/> Record updated in last year

## Plain English summary of protocol

### Background and study aims

Sepsis-like syndrome (SLS, or blood infection) and acute respiratory infection (ARI, or chest infection) are two of the main types of severe viral infection in children. Often these children are so unwell they have to go to hospital. Rarely, long-term problems and even death can result from the infection. In the past bacteria were the main causes for many severe infections. However, due to successful vaccine programmes, viruses are now mostly to blame. This is worrying as viruses have the potential to cause large-scale outbreaks affecting the health of many people, as was the case in the recent worldwide swine flu outbreak. The focus of this study will be the specific viruses that are known to play a role in a proportion of severe cases of SLS and ARI. A better understanding of the role of viruses will help us to diagnose and manage affected children and work out how to better respond to outbreaks. The aim of this study is to look at the causes, symptoms, clinical management, impact and outcomes for children with SLS and ARI. In addition, many viruses traditionally thought to be important causes of SLS and ARI are being detected in children without symptoms. This will be considered by also inviting children without symptoms of SLS or ARI to participate in the study.

### Who can participate?

1. Hospitalised infants (under 6 months old) with signs of blood infections
2. Hospitalised children (under 6 years old) with signs of chest infections
3. Children with no signs of severe infection, attending hospital for surgery, x-ray, blood test etc

### What does the study involve?

Samples are collected from all participants on their day of admission to hospital, including nose swabs, urine, blood and stool samples, as well as cerebrospinal fluid (a body fluid found in the brain and spine), if taken as part of routine treatment, along with other information from the child's medical notes. For the children with signs of blood/chest infections, clinical observations, medications and clinical management are recorded on admission and weekly until discharge or day 30 of hospitalisation (whichever comes first). A few of the children with blood infections are also followed up one year later.

What are the possible benefits and risks of participating?

There are no direct benefits to either the child or the legal guardians/carers of the child, for participating in this study. However, many people find it a real benefit to help in a study which may change how we care for children in the future. There are very few risks associated with this study, as we do not intend to collect any additional samples from the child. On the rare occasion that additional blood samples are needed, the skilled teams will do everything they can to reduce any discomfort to the child, such as using a cream which helps to numb the skin.

Where is the study run from?

1. St George's University of London (UK)
2. University of Tartu (Estonia)
3. C.H. Regionaire Universitaire de Lille (France)
4. H. U. Robert Debrè. Paris (France)
5. National and Kapodistrian University of Athens (Greece)
6. Aristotle University Thessaloniki (Greece)
7. Universitätsklinikum Freiburg (Germany)
8. Azienda Ospedaliera di Padova (Italy)
9. Ospedale Pediatrico Bambino Gesù (Italy)
10. Vilnius University Children's Hospital (Lithuania)
11. Victor Babes Clinical Hospital (Romania)
12. Hospital 12 de Octubre (Spain)
13. Hospital Clinico de Santiago de Compostela (Spain)
14. Kinderspital Zurich (Switzerland)
15. Alder Hey Children's NHS Foundation Trust (UK)
16. Great Ormond Street Hospital (UK)

When is the study starting and how long is it expected to run for?

August 2015 to December 2018

Who is funding the study?

Seventh Framework Programme (Belgium)

Who is the main contact?

Dr Jessica Jarvis

## Contact information

### Type(s)

Scientific

### Contact name

Dr Jessica Jarvis

### Contact details

Paediatric Infectious Diseases Research Group  
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# Additional identifiers

## Protocol serial number

Protocol version 1.0 (18/09/2015)

# Study information

## Scientific Title

Multi-centre EuROpean study of MAJOR Infectious Disease Syndromes (MERMAIDS): community-acquired sepsis-like syndrome and paediatric acute respiratory tract infection in childhood

## Acronym

PED-MERMAIDS

## Study objectives

Sepsis-like syndrome (SLS) and acute respiratory tract infection (ARI) are frequent causes of hospitalisation in infants and young children, and pose a risk of severe outcomes and potentially also of long-term complications. Both can be caused by pathogens with epidemic potential, importantly enterovirus (EV) and human parechovirus (HPeV) for SLS, and respiratory syncytial virus (RSV), FLU, human rhinovirus (HRV), *S. pneumoniae* for ARI. A better understanding of the role of these pathogens can inform diagnostics, surveillance and management in this vulnerable age group as well as prevention and outbreak response management.

The overall aim of this observational, case-control study is to prospectively study the aetiology, diagnostics, clinical management, impact and outcomes across Europe of:

1. Community-acquired sepsis-like syndrome in hospitalised infants (<6 months old)
2. Community-acquired acute respiratory tract infection in hospitalised children (<6 years old)

The study will focus on specific pathogens known to be aetiological agents of the two syndromes of interest (SLS and ARI). The study will also contribute to capacity building within the paediatric PREPARE network aimed at establishing early and robust European responses to (re-)emerging infections including rapid identification, control and research responses.

## Ethics approval required

Old ethics approval format

## Ethics approval(s)

London - City & East Research Ethics Committee, 02/03/2016, REC ref: 16/LO/0163

## Study design

Observational prospective case-control study

## Primary study design

Observational

## Study type(s)

Other

## Health condition(s) or problem(s) studied

## Sepsis-like syndrome (SLS) and acute respiratory infections (ARI) in children

### Interventions

#### ELIGIBILITY

Participants will be assessed against pre-determined eligibility criteria (inclusion and exclusion criteria). Cases will be assessed at the time of presentation or within 24 hours of admission.

This study will recruit children into three groups:

1. Infants (<6 months old) admitted to a participating hospital with a new episode of community-acquired sepsis-like syndrome
2. Children (< 6 years old) admitted to a participating hospital with a new episode of community-acquired acute respiratory infection
3. Age-matched afebrile controls (< 6 years old)

#### STUDY PROCEDURES FOR PARTICIPANTS WITH SLS OR ARI

Informed consent (Day 0) with the option of deferred consent will be sought. All participants for whom legal guardians/carers have provided informed consent will have a baseline assessment that will be recorded on a designated CRF. This will include:

1. Demographics, medical history, physical examination findings and vital signs
2. Basic information on clinical management
3. Results of routine investigations

#### Sampling (Day 0-1)

For SLS and ARI cases, research-specific samples (blood, urine, nasopharyngeal, stool, and if available CSF) will be obtained with the first set of routine samples within 24 hours of admission (day 0) and processed once eligibility has been confirmed and written informed consent has been obtained.

#### Clinical data

Clinical observations, medications and clinical management will be recorded in the CRF on admission/baseline assessment (Day 0), and weekly (every 7 days) for cases until discharge, death or day 30 of hospitalisation (whichever comes first)

Weekly clinical data will include:

1. Documentation of survival status, total days of supplemental oxygen, total days of invasive or non-invasive ventilator support and total days of pharmacological inotropic support
2. Admission to Paediatric Intensive Care Unit or Paediatric High Dependency Unit, and total length of stay, receipt of immunomodulators and duration of antibiotic and/or antiviral exposure during hospitalisation
3. Neurological complications (SLS cases)
4. Developmental assessment at 12 months of age (subgroup SLS cases)

#### Follow up visits

Follow-up visits are not planned for most cases or controls, except for a subgroup of approximately 40 SLS cases. They will be invited for developmental assessments at 12 months of age.

#### STUDY PROCEDURES FOR CONTROLS

### Informed consent (Day 0)

For controls, deferred consent will not apply as their admission will be planned and not an emergency. Research-specific samples will be obtained only after parental informed consent has been given.

### Baseline assessment (Day 0)

All participants for whom legal guardians/carers have provided informed consent will have a baseline assessment

that will be recorded on a designated CRF. This will include:

1. Demographics
2. Medical history
3. Physical examination findings
4. Vital signs

### Sampling (Day 0-1)

Samples will include nasopharyngeal swab, blood, urine and stool samples

Follow-up visits are not planned for controls

### Intervention Type

Other

### Primary outcome(s)

SLS

1. The proportions of infants with SLS in whom EV or HPeV is detected in blood (day 0) and the strength of association between EV or HPeV detection in blood in SLS cases compared to controls (odds ratio and 95% CI)
2. The proportions of infants with SLS in whom EV or HPeV is detected in nasopharyngeal and/or stool samples (day 0) and the strength of association between EV or HPeV detection in nasopharyngeal and/or stool samples in SLS cases compared to controls (odds ratio and 95% CI)

ARI

The proportions of infants with ARI in whom RSV, FLU, HRV or *S. pneumoniae* is detected in nasopharyngeal samples (day 0) and the strength of association between their detection in nasopharyngeal samples in ARI cases compared to controls (odds ratio and 95% CI)

### Key secondary outcome(s))

SLS

1. Association between viral load in blood on day 0 and disease severity
2. Association between pathogen co-detection on day 0 and disease severity
3. Subtypes of EV or HPeV identified in blood collected on day 0
4. Characterisation of key parameters describing clinical management of SLS including:
  - 4.1. Proportion admitted to intensive care (and duration) during hospitalisation
  - 4.2. Proportion treated with antimicrobials, antivirals and/or immunomodulators during admission (and average duration of treatment)
  - 4.3. Proportion of cases requiring during admission: supplemental oxygen, non-invasive or invasive mechanical ventilation, extra-corporeal life support
  - 4.4. Duration of invasive mechanical ventilation and extra-corporeal life support, if applicable
  - 4.5. Average length of hospitalisation (in days)
  - 4.6. In-hospital mortality
5. Bayley scales of infant development and Denver II developmental screening test at discharge and at 12 months of age in a subset of 40 SLS cases

Severe disease will be defined as cases with requirement for supplementary oxygen, ventilatory and/or inotropic support (pharmacological or mechanical) and/or cases who die in hospital (all-cause mortality)

#### ARI

1. Association between viral load in nasopharyngeal swabs on day 0 and disease severity
2. Association between bacterial load in nasopharyngeal swabs on day 0 and disease severity
3. Association between pathogen co-detection in nasopharyngeal swabs on day 0 and disease severity
4. Characterisation of key parameters describing clinical management of ARI including:
  - 4.1. Proportion admitted to intensive care during hospitalisation and average length of stay
  - 4.2. Proportion treated with antimicrobials, antivirals and/or immunomodulators during admission (and average duration of treatment)
  - 4.3. Proportion of cases requiring during admission: supplemental oxygen, non-invasive or invasive mechanical ventilation, extra-corporeal life support
  - 4.4. Duration of invasive mechanical ventilation and extra-corporeal life support, if applicable
  - 4.5. Average length of hospitalisation (in days)
  - 4.6. In-hospital mortality
5. Comparison of gene expression profiles (microarray) associated with SARI in adult patients to gene expression profiles in children with severe disease ARI

Severe disease will be defined as cases with requirement for supplemental oxygen and/or ventilatory and/or inotropic support (pharmacological or mechanical) and/or cases who die in hospital (all-cause mortality)

#### Completion date

31/12/2018

## Eligibility

#### Key inclusion criteria

The study will recruit into three groups (SLS, ARI and controls), each with different inclusion criteria.

#### SLS Group Cases:

1. Age <6 months old on the day of admission (day 0) into the study
2. Onset of symptoms within 7 days
3. The attending physician has decided that the infant requires hospitalisation
4. Temperature  $\geq 38^{\circ}\text{C}$  or  $< 36^{\circ}\text{C}$  measured by any method
5. Informed consent collected on admission or within 48 hours available from guardian/carer

AND at least TWO of the below (with at least ONE of either 1 or 2):

1. Signs of cardiovascular dysfunction: age-related tachycardia or bradycardia or hypotension or need for  $\geq 40$  ml/kg fluid resuscitation in first hour after presentation to hospital on day of recruitment
2. Signs of respiratory dysfunction: age-related tachypnoea or brady/apnoea or decreased oxygen saturation ( $< 92\%$  in room air)
3. Skin signs: mottled skin appearance or non-blanching rash or central CRT  $> 2$  seconds
4. Neurological signs: irritability, hypotonia, lethargy or an AVPU score V or below

#### ARI Group Cases:

1. Age <6 years old on the day of admission (day 0) into the study

2. Clinical suspicion of a new episode of acute respiratory tract illness within the last 7 days
3. The attending physician has decided that the child requires hospitalisation
4. Primary reason for hospital admission is clinical suspicion of a new episode of ARI
5. Temperature  $\geq 38^{\circ}\text{C}$  measured by any method
6. Informed consent collected on admission or within 48 hours available from guardian/carer

AND at least TWO of the below (with at least ONE of 1 or 2):

1. Signs of lower respiratory tract infection: cough, abnormal sounds on chest auscultation (crackles, reduced breath sounds, bronchial breathing, wheezing), dyspnoea (chest indrawing, nasal flaring, grunting)
2. Signs of upper respiratory tract infection: coryza, nasal congestion, sore throat, pharyngitis, myringitis, acute otitis media
3. Signs of respiratory dysfunction: age-related tachypnoea or brady/apnoea or decreased oxygen saturation ( $<92\%$  in room air)
4. Signs of reduced general state: poor feeding, vomiting, lethargy/drowsiness

#### CONTROLS:

1. Age  $< 6$  years old on the day of enrolment into the study
2. Afebrile on the day of enrolment
3. No evidence of severe infection as judged by attending physician
4. Informed consent available from guardian/carer

Controls aged  $< 6$  months old will be shared between both groups. Controls should be matched to cases stratified by five age groups (0-3 months, 4-6 months, 7-11 months, 12 months-2 years and 3-5 years) and season (three-monthly intervals starting with January-March). They may be selected from the following patient groups:

1. Attending for an elective or semi-elective procedure requiring general anaesthesia or moderate-deep sedation (including e.g. surgery, radiological examinations etc)
2. Well and otherwise healthy children attending outpatient clinic for a non-emergency clinical assessment for which a blood test is indicated as part of routine clinical care

#### Participant type(s)

Patient

#### Healthy volunteers allowed

No

#### Age group

Mixed

#### Sex

All

#### Key exclusion criteria

The study will recruit into three groups (SLS, ARI and case-controls), each with different exclusion criteria.

#### SLS Group Cases:

1. In-patient care for 24 hours or more for any condition within the previous 30 days, except for routine postnatal care

2. Aetiology other than infection (such as trauma, autoimmune disorder, malignancy) is suspected to be the primary cause of the current illness episode
3. Any signs and symptoms suggesting a clear primary focus of infection, such as pneumonia, urinary/kidney infection, open wounds, indwelling catheters, re-activation of previously diagnosed infectious or inflammatory condition
4. Dehydration due to previous illness episode such as diarrhoea and vomiting
5. Immunocompromised infant (stem cell transplant, solid organ transplant, HIV, AIDS, immunosuppressive therapy, inherited or congenital immunodeficiency, haemodialysis)
6. Presence of complex chronic comorbidities
7. Body weight <3kg on day of assessment and/or corrected gestational age <37 weeks

#### ARI Group Cases:

1. In-patient care for 24 hours or more for any condition within the previous 30 days, except for routine postnatal care
2. Aetiology other than infection (such as trauma, autoimmune disorder, malignancy) is suspected to be the primary cause of the current illness episode
3. Any signs and symptoms suggesting a clear primary focus of infection, such as urinary/kidney infection, open wounds, indwelling catheters, re-activation of previously diagnosed infectious or inflammatory condition
4. Dehydration due to previous illness episode such as diarrhoea and vomiting
5. Immunocompromised infant (stem cell transplant, solid organ transplant, HIV, AIDS, immunosuppressive therapy, inherited or congenital immunodeficiency, haemodialysis)
6. Presence of complex chronic comorbidities
7. Body weight <3 kg on day of assessment and/or corrected gestational age <37 weeks

#### Controls:

1. In-patient care for 24 hours or more for any condition within the previous 30 days except for routine postnatal care or current planned hospitalisation/procedure
2. Temperature  $\geq 38.5^{\circ}\text{C}$  or  $< 36^{\circ}\text{C}$
3. Immunocompromised infant (stem cell transplant, solid organ transplant, HIV, AIDS, immunosuppressive therapy, inherited or congenital immunodeficiency, haemodialysis)
4. Presence of complex chronic comorbidities
5. Body weight <3kg on day of assessment and/or corrected gestational age <37 weeks

#### Date of first enrolment

15/08/2016

#### Date of final enrolment

30/06/2018

## Locations

#### Countries of recruitment

United Kingdom

England

Estonia

France



Germany

Greece

Italy

Lithuania

Romania

Spain

Switzerland

**Study participating centre**  
**St George's University of London**  
London  
United Kingdom  
SW17 ORE

**Study participating centre**  
**University of Tartu**  
Tartu  
Estonia  
50090

**Study participating centre**  
**C.H. Regionaire Universitaire de Lille**  
Lille  
France  
59037

**Study participating centre**  
**H. U. Robert Debrè. Paris**  
Paris  
France  
75019

**Study participating centre**  
**National and Kapodistrian University of Athens**  
Athens

Greece  
106 79

**Study participating centre**  
**Aristotle University Thessaloniki**  
Thessaloniki  
Greece  
541 24

**Study participating centre**  
**Universitätsklinikum Freiburg**  
Freiburg  
Germany  
79106

**Study participating centre**  
**Azienda Ospedaliera di Padova**  
Padova  
Italy  
2 - 35128

**Study participating centre**  
**Ospedale Pediatrico Bambino Gesù**  
Rome  
Italy  
4 - 00165

**Study participating centre**  
**Vilnius University Children's Hospital**  
Vilnius  
Lithuania  
01513

**Study participating centre**  
**Victor Babes Clinical Hospital**  
Romania  
030303

**Study participating centre****Hospital 12 de Octubre**

Madrid

Spain

28041

**Study participating centre****Hospital Clinico de Santiago de Compostela**

Santiago de Compostela

Spain

15706

**Study participating centre****Kinderspital Zurich**

Zurich

Switzerland

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**Study participating centre****Alder Hey Children's NHS Foundation Trust**

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**Study participating centre****Great Ormond Street Hospital**

London

United Kingdom

WC1N 3JH

**Sponsor information****Organisation**

Fondazione PENTA Onlus

**ROR**<https://ror.org/00d7mpc92>

# Funder(s)

## Funder type

Government

## Funder Name

Seventh Framework Programme

## Alternative Name(s)

EC Seventh Framework Programme, European Commission Seventh Framework Programme, EU Seventh Framework Programme, European Union Seventh Framework Programme, FP7

## Funding Body Type

Government organisation

## Funding Body Subtype

National government

## Location

# Results and Publications

## Individual participant data (IPD) sharing plan

## IPD sharing plan summary

Not expected to be made available

## Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
<a href="#">HRA research summary</a>			28/06/2023	No	No
<a href="#">Participant information sheet</a>	Participant information sheet	11/11/2025	11/11/2025	No	Yes