

# INPLASY PROTOCOL

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**Conflicts of interest:**  
None declared.

## The impact of Primary Ciliary Dyskinesia on female and male fertility: A narrative systematic review (Protocol)

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**Review question / Objective:** 1) What is the prevalence of infertility in men and women with primary ciliary dyskinesia? 2) What are the potential mechanisms underlying the impact of primary ciliary dyskinesia on fertility? 3) How successful are use of artificial reproductive techniques (ART) in women and men with PCD?

**Condition being studied:** Sub-fertility can be defined as failure to conceive after one year of regular unprotected sexual intercourse. Sub-fertility is commonly reported as a symptom of primary ciliary dyskinesia. Sub-fertility has a significant negative psychosocial impact on those affected by this problem.

**INPLASY registration number:** This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 12 July 2022 and was last updated on 12 July 2022 (registration number INPLASY202270062).

### INTRODUCTION

**Review question / Objective:** 1) What is the prevalence of infertility in men and women with primary ciliary dyskinesia? 2) What are the potential mechanisms underlying the impact of primary ciliary dyskinesia on fertility? 3) How successful are use of artificial reproductive techniques (ART) in women and men with PCD?

**Rationale:** Infertility is reported as a concern by patients with PCD and is a commonly stated clinical feature in both men and women, however reported fertility rates vary significantly in the literature. The underlying mechanisms for sub fertility in this patient group are not fully understood and the success of artificial reproductive techniques (ART) in men and

women with primary ciliary dyskinesia are unknown. Whilst PCD is considered a rare disease, understanding the pathophysiology and optimal management of subfertility in this patient group may also aid our knowledge of the wider role of cilia in reproduction. This may help guide our management of other patients with subfertility who may have secondary ciliopathies caused by common environmental exposures such as smoking or infection.

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## METHODS

**Search strategy:** MEDLINE, Embase, Cochrane Library and PubMed electronic databases were searched. Searches were limited to research published in the English language between 1964 and 2022. Search terms used included: ('primary ciliary dyskinesia' OR 'immotile ciliary syndrome' OR 'Kartagener syndrome') AND ('fertility' OR 'infertility' OR 'subfertility' OR 'pregnancy' OR 'reproduct\*\*').

**Participant or population:** The population being studied in this review is people with a diagnosis of primary ciliary dyskinesia. Primary ciliary dyskinesia (PCD) is a genetic condition affecting the structure and function of sperm and motile cilia including those in the male and female reproductive tracts. Studies involving both males or females of reproductive age that report fertility outcomes will be included in this review. Animal and plant studies will be excluded.

**Intervention:** 1) Exposure: primary ciliary dyskinesia in men and women of reproductive age who have attempted to conceive. 2) Intervention: artificial reproductive techniques use in men and women of reproductive age with primary

ciliary dyskinesia. Examples of artificial reproductive techniques include in-vitro fertilisation and artificial insemination.

**Comparator:** Not applicable.

**Study designs to be included:** Due to the sparsity of published literature on this topic/population all original research studies reporting fertility outcomes in humans with primary ciliary dyskinesia will be included.

**Eligibility criteria:** Primary research articles which reported on fertility or pregnancy in human subjects with primary ciliary dyskinesia or Kartagener syndrome in English language were included. Animal studies and cases where gender was not specified or where subjects were diagnosed with another medical condition also known to impact fertility were excluded.

**Information sources:** MEDLINE, Embase, Cochrane Library and PubMed electronic databases were searched. Where data was missing, authors were attempted to be contacted.

**Main outcome(s):** 1) Outcome of spontaneous conception and live births or sub-fertility in men and women of reproductive age with primary ciliary dyskinesia who have attempted to conceive. Sub-fertility can be defined as failure to conceive after one year of regular unprotected sexual intercourse. 2) Outcome of conception and live births after artificial reproductive techniques use in men and women of reproductive age with primary ciliary dyskinesia. Examples of artificial reproductive techniques include in-vitro fertilisation and artificial insemination.

**Data management:** Data will be stored in using Microsoft Excel.

**Quality assessment / Risk of bias analysis:** Inclusion criteria, study type, sample size. Two reviewers will primarily be involved in reviewing publications. A third reviewer will be consulted when disagreement occurs.

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**Strategy of data synthesis:** Outcome of spontaneous conception and live births will be reported/summarised as described above, no minimum number of studies will be used. Data will be summarised in tables. Meta-analysis will likely not be possible due to the small sample sizes and sparsity of data.

**Subgroup analysis:** Not applicable.

**Sensitivity analysis:** Not applicable.

**Language:** English language.

**Country(ies) involved:** United Kingdom.

**Keywords:** Primary ciliary dyskinesia; Fertility; Artificial reproductive techniques; Kartagener syndrome; Motile cilia.

**Dissemination plans:** Intend to publish results in peer review international journal and present at national/international conference.

**Contributions of each author:**

**Author 1 - Lydia Newman -** Conducted database searches. Screened papers for inclusion. Data extraction and synthesis. Drafted the manuscript.

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**Author 2 - Jagrati Chopra.**

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**Author 8 - Jane Lucas.**

**Author 9 - Ying Cheong.**