

# New Zealand Paediatric Surveillance Unit

## STUDY PROTOCOL

### X-Linked Hypophosphataemic Rickets (XLH) Prevalence Study

*(A one-off survey conducted by the NZPSU)*

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#### BACKGROUND

X-linked hypophosphataemia (XLH) is a disorder of renal phosphate wasting, defective bone mineralisation, and impaired growth plate ossification. It is caused by inactivating mutations in the PHEX gene, and is the most common form of heritable rickets. In the absence of functional PHEX, release of fibroblast growth factor 23 (FGF23) by osteocytes is greatly increased, leading to increased loss of phosphate in the urine and consequent hypophosphatemia. FGF23 also suppresses 1,25-dihydroxyvitamin D production, resulting in decreased intestinal absorption of calcium and phosphate. Chronic low serum phosphorus levels result in defective bone mineralisation manifesting as rickets or osteomalacia.

The goal of therapy in children with XLH is to correct or minimise rickets and skeletal deformities, and to promote maximal growth potential while preventing the lifelong bone- and joint-related complications of rickets. The goal of therapy in adults is to reduce pain and optimise bone health and function.

The most common therapy for children with XLH consists of multiple daily doses of oral phosphate combined with doses of active vitamin D analogs (calcitriol). This aims to sufficiently supplement total body phosphate to allow mineralisation of bone and improve skeletal outcomes. However, supplementation therapy does not address the mechanism of urinary phosphate wasting and raises the risk of nephrocalcinosis due to increased urinary phosphate. Burosumab is a recent addition to the treatment available for children and adults with XLH. Burosumab is a monoclonal antibody that inhibits the biological activity of FGF23, restoring renal phosphate reabsorption, increasing the serum concentration of 1,25-dihydroxyvitamin D and improving rickets and osteomalacia.

#### STUDY OBJECTIVES:

This study aims to:

1. Estimate the national prevalence of XLH in Aotearoa.
2. Describe the prevalent cases in terms of:
  - a. Demographics: age at diagnosis, ethnicity
  - b. Family history of XLH
  - c. Presenting biochemical, clinical features and complications
  - d. Therapies used to treat patients with XLH

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#### CASE DEFINITION:

Rickets during childhood: Radiological evidence of rickets, alkaline phosphatase (ALP) above the normal age and gender-matched limits of the local laboratory range and serum phosphate below the normal limits of the local laboratory range

**AND**

Pathogenic mutation in the PHEX gene

**OR**

FGF23 levels above the limits of the local laboratory range

**OR**

Family history that supports X-linked inheritance

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## REPORTING INSTRUCTIONS:

Please report any child with XLH under your care since January 1 2014 by returning the card within 1 month of receipt.

Paediatricians will receive a one-off XLH report card in addition to the usual NZPSU report card.

Adult endocrinologists and renal physicians will receive the same one-off NZPSU report card and should report directly to the NZPSU.

## PRINCIPAL INVESTIGATORS

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## REFERENCES

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