



# Learning to Grow: A Year in the Life of Queensland's Vosoritide Multidisciplinary Clinic for Achondroplasia



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Queensland  
Government

# The Journey So far

- Who: Brief introduction to Achondroplasia and Vosoritide
- Where: Our clinic
- What: Our approach to this precision treatment advance
- Why: Hearing the Progress to date
- How... will future directions go?



*Article*

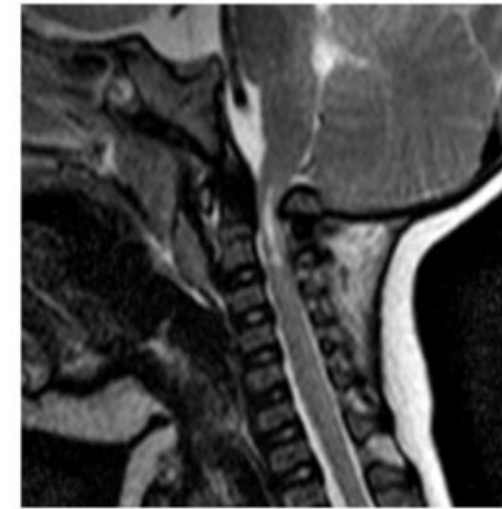
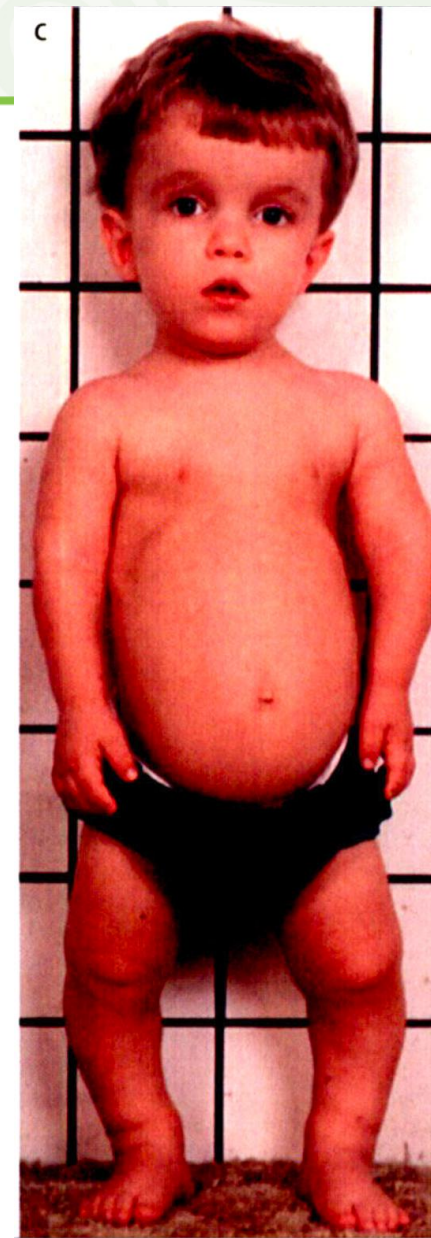
## Consensus Guidelines for the Use of Vosoritide in Children with Achondroplasia in Australia

Louise Tofts <sup>1,\*</sup> , Penny Ireland <sup>2,3,4</sup>, Tracy Tate <sup>5</sup>, Supriya Raj <sup>4</sup>, Theresa Carroll <sup>2</sup>, Craig F. Munns <sup>2,6</sup>, Stephen Knipe <sup>7</sup>, Katherine Langdon <sup>8,9</sup> , Lesley McGregor <sup>10</sup>, Fiona McKenzie <sup>11,12</sup> , Andreas Zankl <sup>13,14,15</sup> and Ravi Savarirayan <sup>4,16</sup>



# Achondroplasia

- Most common form of short-limbed dwarfism
  - Estimated 1 in 25,000-30,000 live births
  - Heterozygous FGFR3 mutation (c.1138G>A; p.Gly380Arg)
  - 80% of achondroplasia cases occur de novo (Horton, et al., 2007)
- Downregulation of growth plate chondrocyte proliferation and differentiation → reduced endochondral bone growth
- Rhizomelia, radial head subluxation, elbow contractures, trident hands, genu varum (Ireland, et al., 2011)
    - difficulty with self-care tasks
  - Foramen magnum stenosis, macrocephaly (midface hypoplasia)
    - central sleep apnoea, cranial nerve compression, weakness, motor delays, risk of sudden death, recurrent ear infections (assoc. hearing loss)
  - Spinal canal stenosis and nerve root compression
    - pain, sensory and motor deficits, bladder and bowel dysfunction



Cheung MS. Arch Dis Child. 2021 Feb;106(2):180-184.

Horton WA Lancet. 2007 Jul 14;370(9582):162-172.

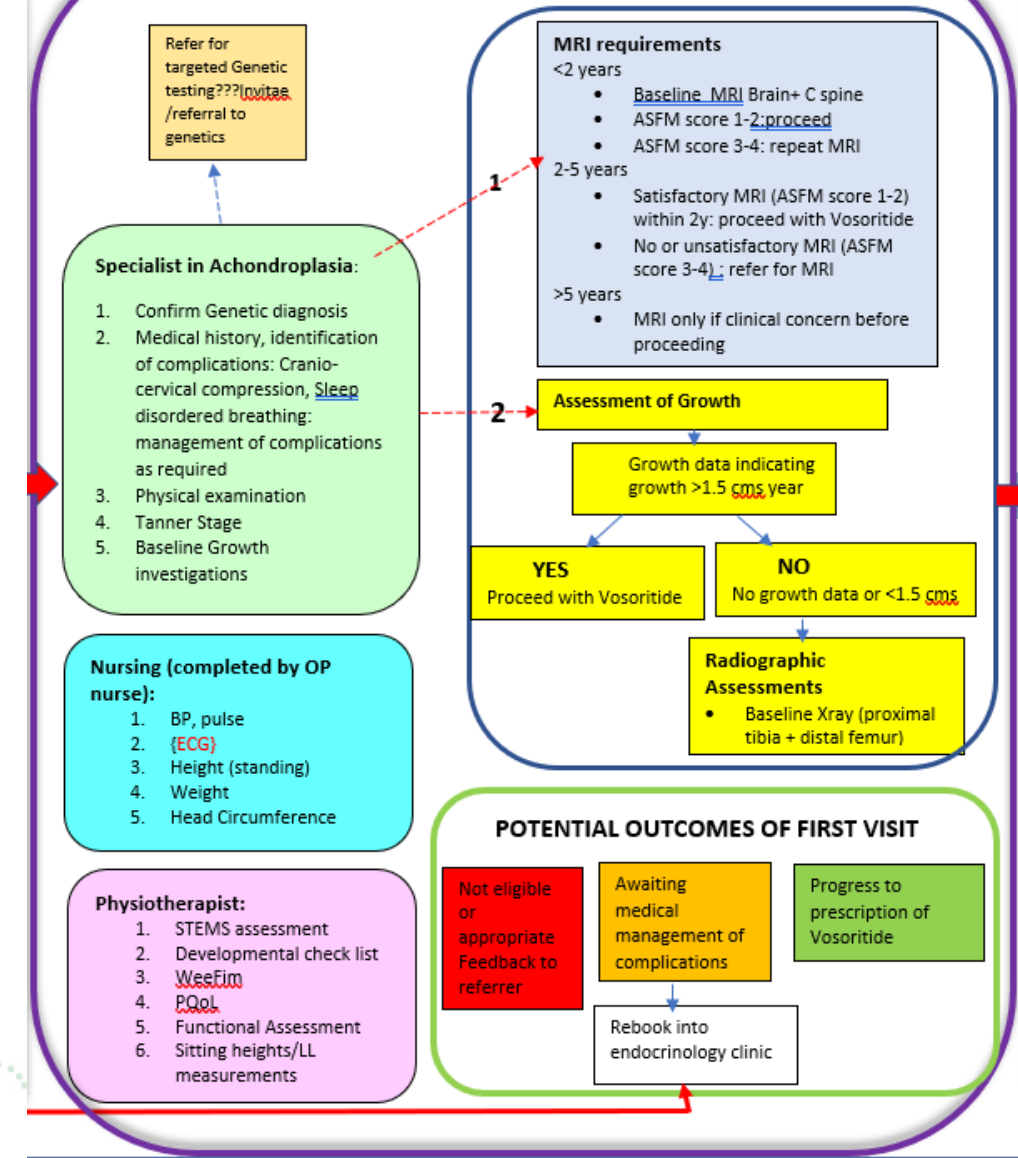
# Our Clinic

- Our clinic is for the 'whole' patient (*not only about a drug*)

- Dedicated achondroplasia vosoritide clinic based in the Department of Endocrinology and Diabetes
- Fortnightly clinics
- Multidisciplinary team:

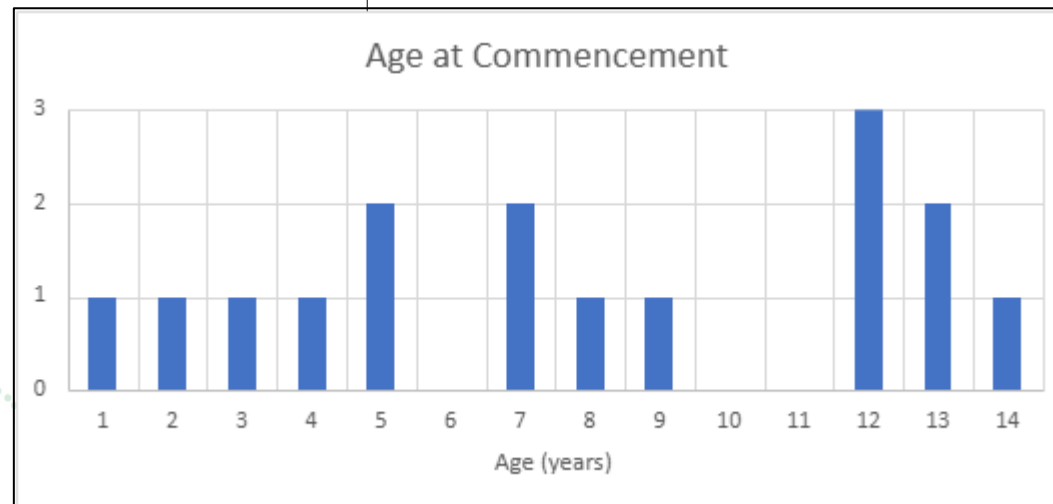
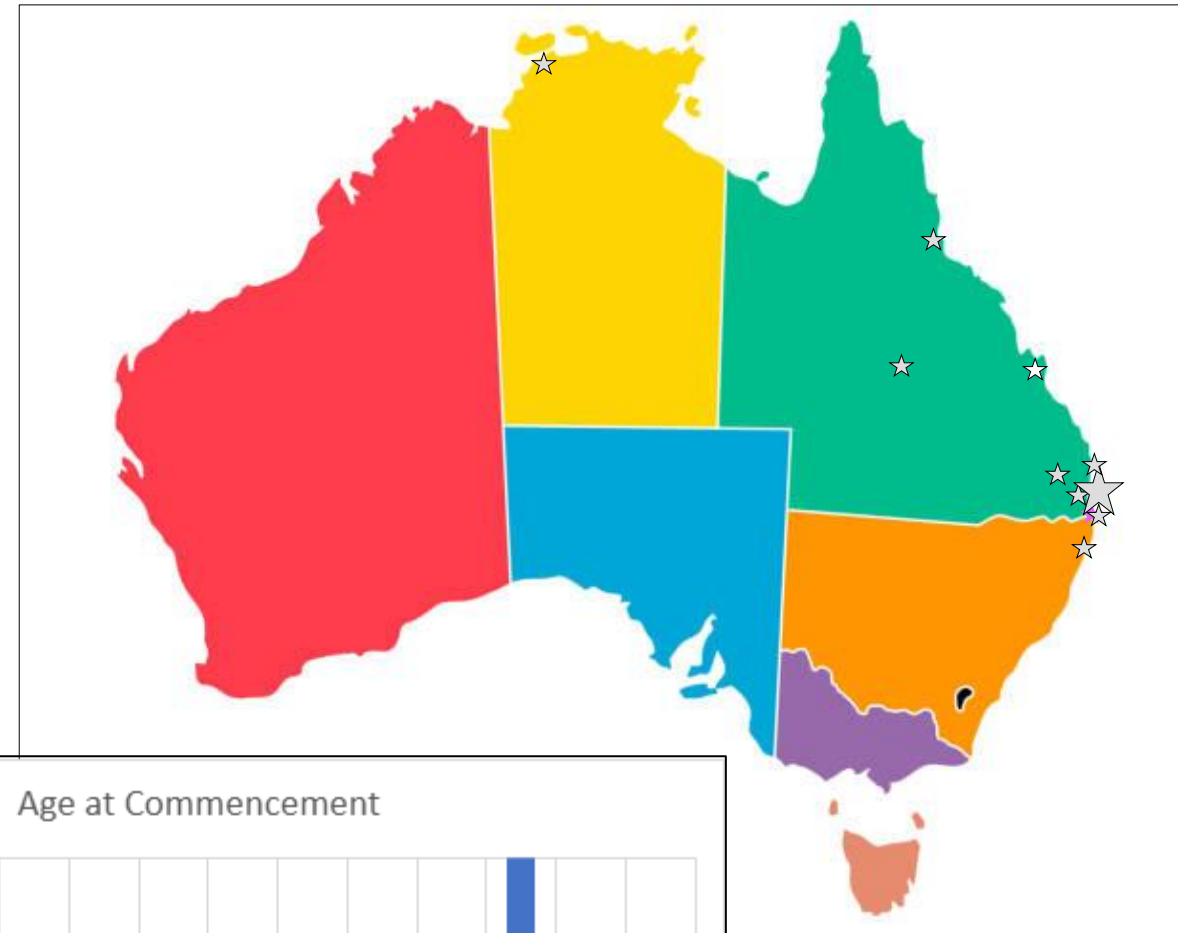


## Assessment Pathway – First clinic visit



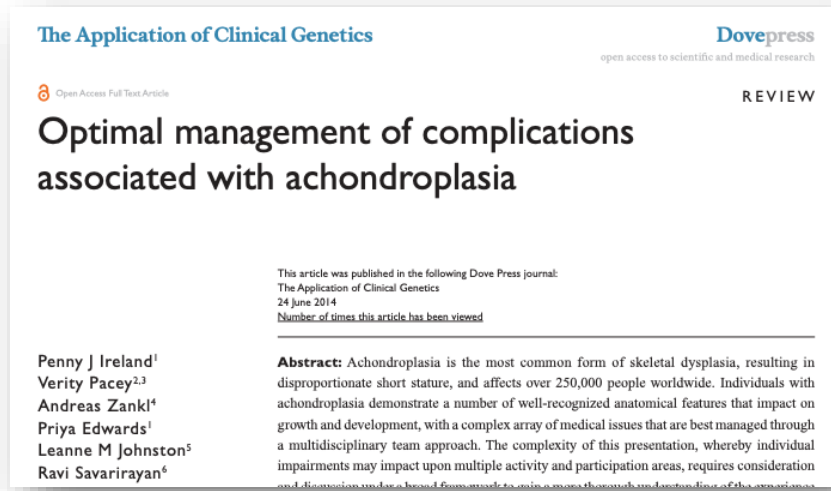
# Progress to date

- Commenced seeing patients July 2023
- 16 patients commenced Vosoritide (age range: 14 months to 15 years old)
  - x2 assessed as eligible <1yo (@ 6m & 9m respectively)
- 11 have reached 12 months of treatment
- No reports of serious adverse events to date
  - Minor redness and swelling at injection site
  - 1x episode of mild self-limiting hypotension at initiation
- No patients have discontinued treatment



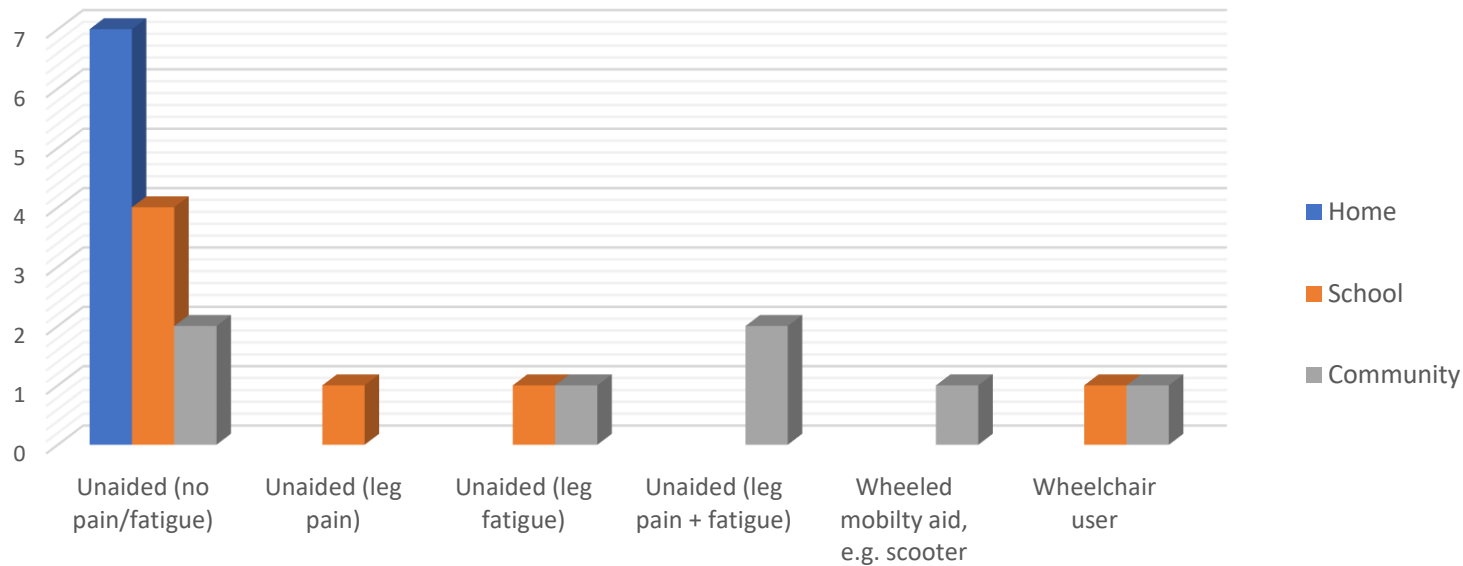


# How has our cohort presented?

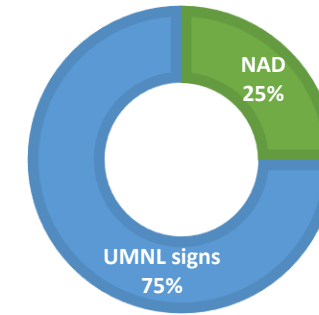


# How has our cohort presented?

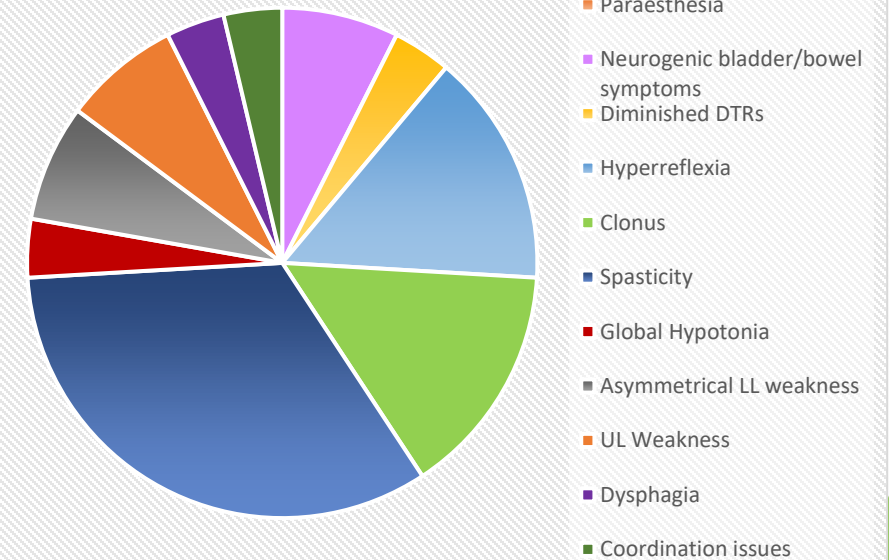
Screening Tool for Mobility and Symptoms (STEMs)



INITIAL NEUROLOGICAL EXAMINATION



UMNL Signs at Baseline Ax



# First disease-specific Rx: Vosoritide

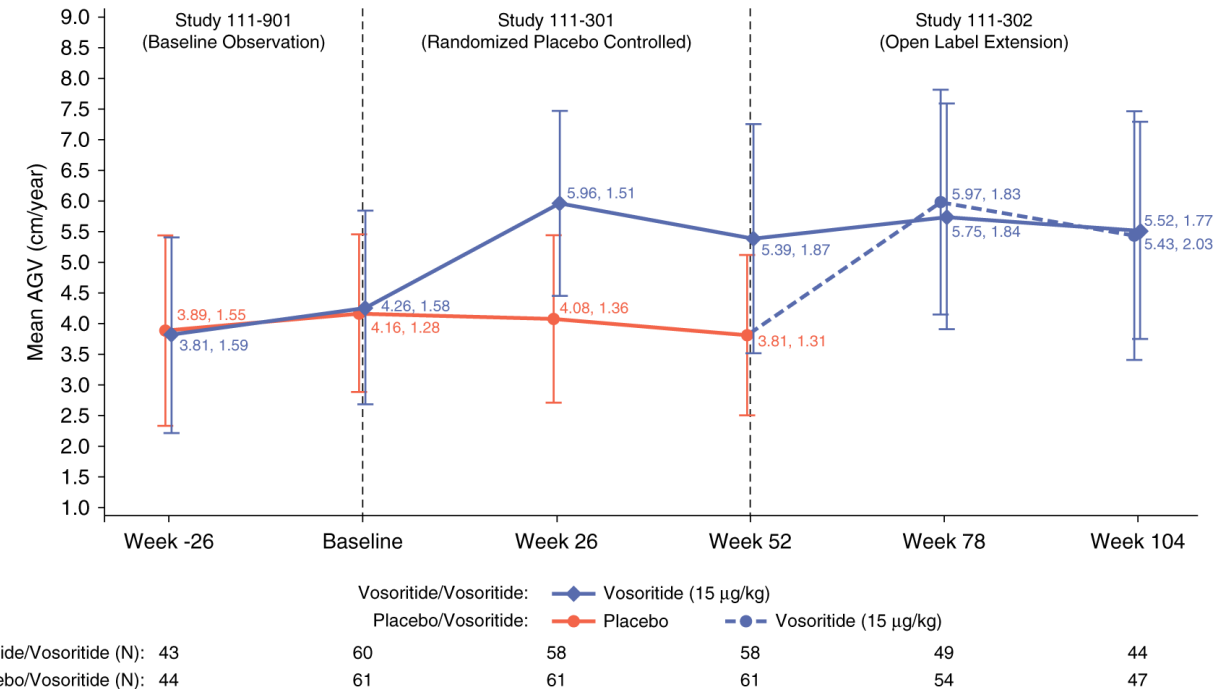
- Trade name VOXZOGO® (BioMarin Pharmaceuticals)
- On PBS for achondroplasia since 2023
- Available for children 0-2 years old since 2024
- Cost approx. \$300,000 per year
- Daily subcut injection
- **Safe & efficacious at making long-bones longer in Achondroplasia**

So they can grow, but does it improve anything else?

## PBS Criteria:

- Diagnosis of achondroplasia, confirmed by genetic testing
- Must not have growth plate closure (based on bilateral knee x-ray or an annualized GV of >1.5cm/year)
- Must be treated by a medical specialist experienced in the management of achondroplasia OR a paediatrician in consultation with an experienced specialist

## Mean annualized growth velocity Vosoritide vs placebo





# Consumer's Goals for Vosoritide

*"I'd love to see him make more **progress** across all **developmental domains**, because he's quite delayed currently."*

*(mother of a 4yo Male)*

*"...to put on and take off my **shoes** without as much **back pain**."*

*(13yo Male)*

*"Reaching things in my wardrobe **by myself**.  
Managing stairs with **less tiredness**.  
And long term, getting a part-time **job**,  
e.g. fast food."* (14yo Male)

*"I'd like to run faster."*

*I'd like to be able to get my togs [swimsuit] on over my shoulders more easily **by myself**.*

*I'd like to be able to pull down and pull back up my undies and shorts when I'm all **sweaty** after lunchbreak.*

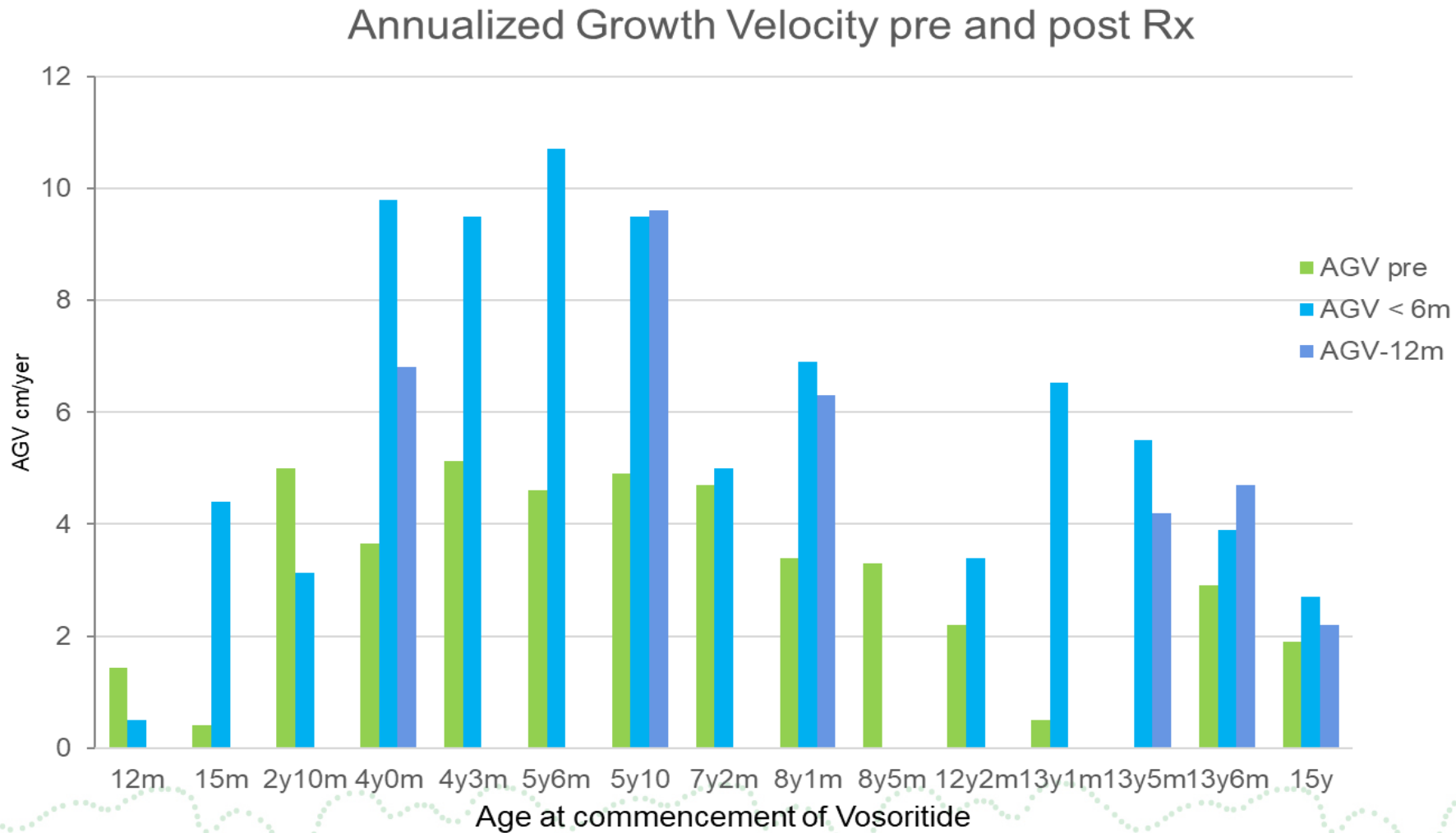
*It'd also be cool to reach further, like the taps in the toilets at the shopping centre, **all on my own**." (9yo Female)*



## u Outcomes to date



# Preliminary growth data



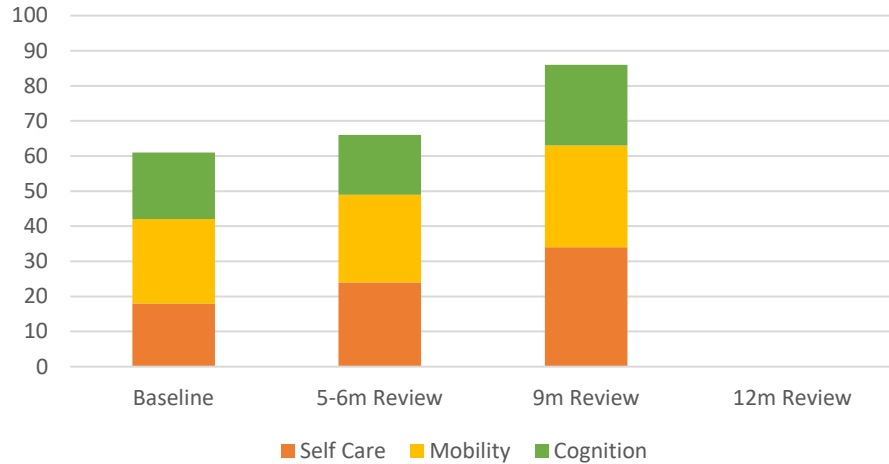
Slide courtesy of Dr Theresa Carroll



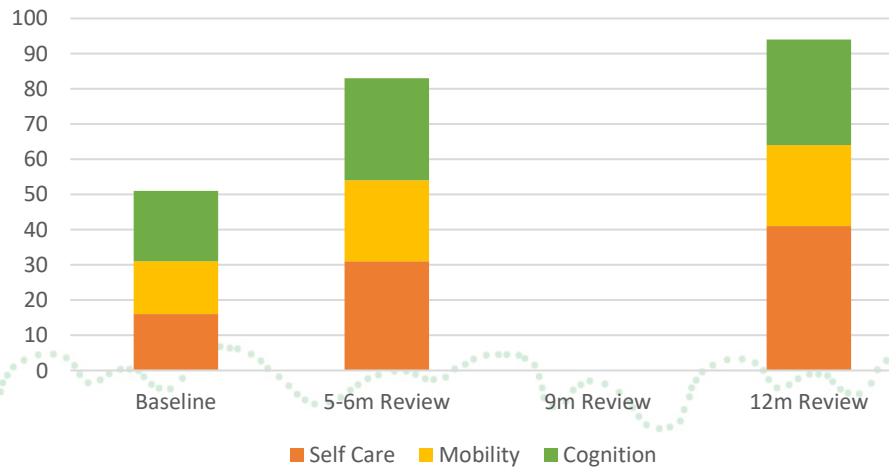
# An Overview of 12m Functional Data



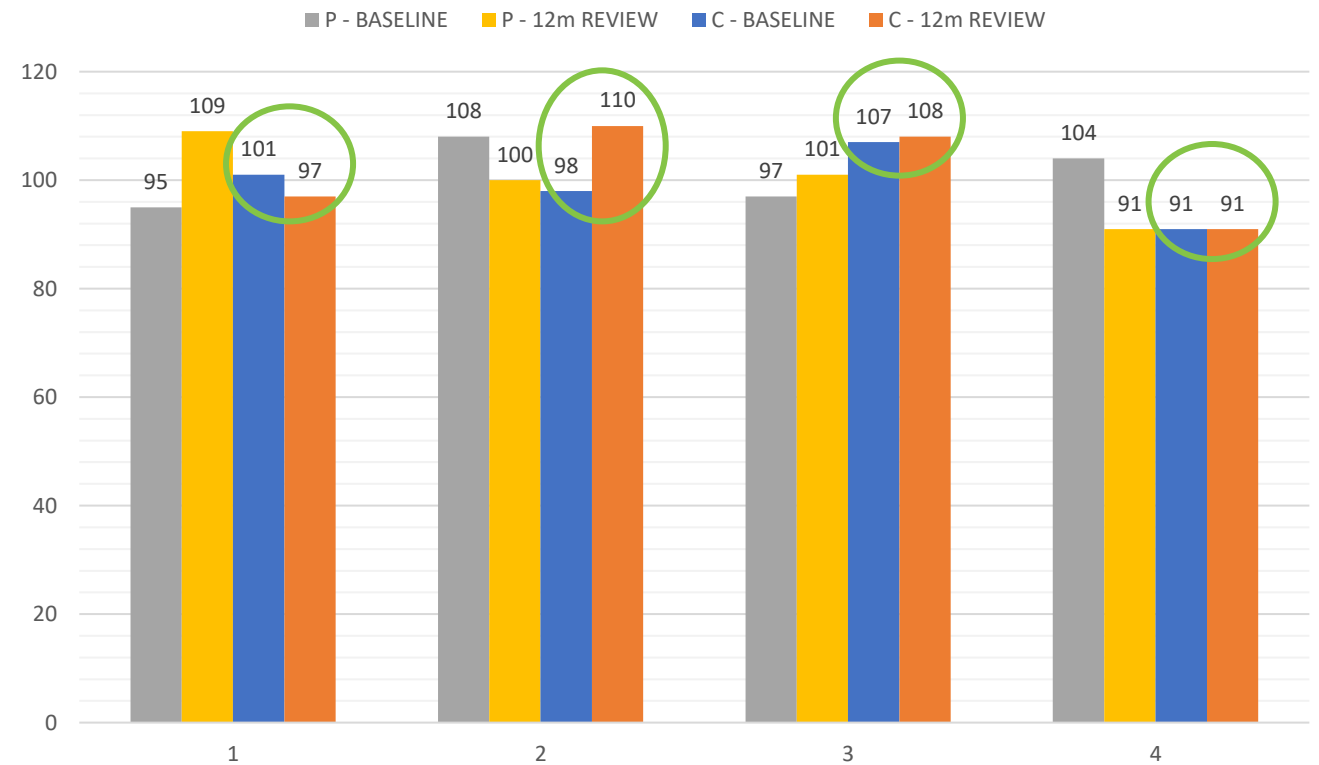
WeeFIM (2->3yo)



WeeFIM (3->4yo)



Activities Scales for Kids (ASK-30)



# Functional Achievements on Vosoritide



Images: AI generated

# Key Learnings & previously unexplained benefits

- Increased **energy levels/stamina** (& appetite)
- Incidence of **pain**
  - just living with it all - haven't known any differently... until it's not there...?
- **Developmental progress** across domains
  - Unknown mechanism / pathophysiology
  - Unknown relationship (coincidence or not?)
- Incidence of **radiculopathy** and neurological compromise
  - Asymmetrical LL neuro-orthopaedic
- Checking **Paralympic Classification** criteria\*
  - Class 8, Short Stature (S-SB6 or S-SB7)
  - Safe & Legal as a 'growth enhancer'

"He's making leaps and bounds with his gross motor development. This has been his most rapid period of progress (since commencing Vosoritide)." (*Community Physiotherapist*)

"His vocabulary has exponentially increased since starting on Vosoritide. He's picking up words from his peers, such as "lame" – the other day, my husband and I said, 'he's sounding like a teenager now'!". (*patient's mother*)



Source: ABC News

## Key Qns remaining:

- *Impact on foramen magnum stenosis?*
  - *Foramen magnum grows rapidly in first months of life – will we see any change if vosoritide is commenced in infancy?*
  - *Impact on developmental timeline?*
  - *Impact on sleep disordered breathing or ENT issues?*
- *Impact on musculoskeletal sequelae, such as genu varum or spinal canal stenosis?*
- *Mechanism for impact on reducing pain?*



➤ Contributing to **national Ax standardization**



## Acknowledgements

### Our patients & families!

- Dr Karissa Ludwig
- Professor Craig Munns
- A/Prof Penny Ireland
- Emma Pendlebury
- Dr Theresa Carroll
- Dr Tony Huynh

## Questions?

Contact the MDT here: [QBAMS@health.qld.gov.au](mailto:QBAMS@health.qld.gov.au)

If you think you have someone who might be interested, get in touch!

