motor neurone disease association

The Newcastle upon Tyne Hospitals NHS Foundation Trust

Physiotherapy management of hypertonia in people with MND

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- Spasticity/ hypertonia- what is it and why does it matter
- Problems related to hypertonia
- MDT management
- Physiotherapy interventions

Clinical features of UMN involvement

Positive Features	Negative features
Increased/ exaggerated reflexes Clonus Associated reactions Spasticity Spasms	Muscle weakness Loss of dexterity/ fine motor movement Fatigueability

Spasticity

Clonus

Hypertonia

Ridgidity

High tone

Spasms

Cramps

Tight muscles

Contractures

Muscle stiffness

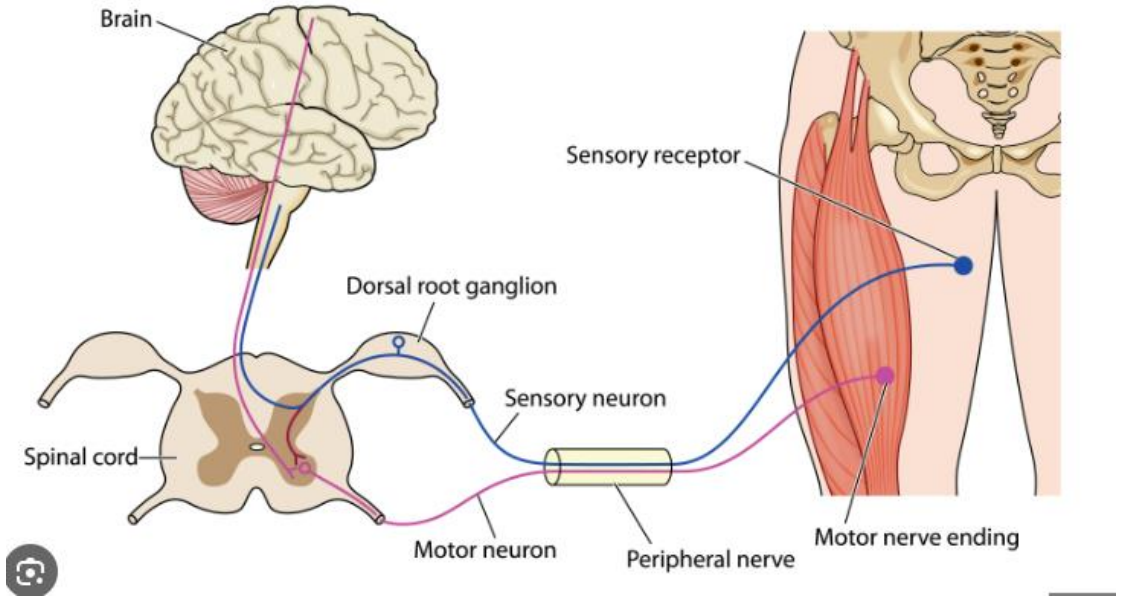
What is spasticity?

Spasticity is:

'A motor disorder characterised by a velocity-dependent increase in tonic stretch reflexes (muscle tone) with exaggerated tendon jerks, resulting from hyperexcitability of the stretch reflex" (Lance, 1980)

'A disordered sensor-motor control, resulting from an Upper motor neurone lesion presenting as intermittent or sustained involuntary activation of muscles" (Pandyan et al, 2005)

'Involuntary muscle overactivity, which commonly follows damage to the central nervous system (brain and spinal cord). It presents in a variety of ways depending on the size, location and age of the lesion, and may have a number of harmful secondary effects such as pain, deformity and impaired function' (RCP, 2009)



What is Hypertonia

Spasticity is only one component of hypertonia.

At a clinical level, two main factors contribute to resistance to movement:

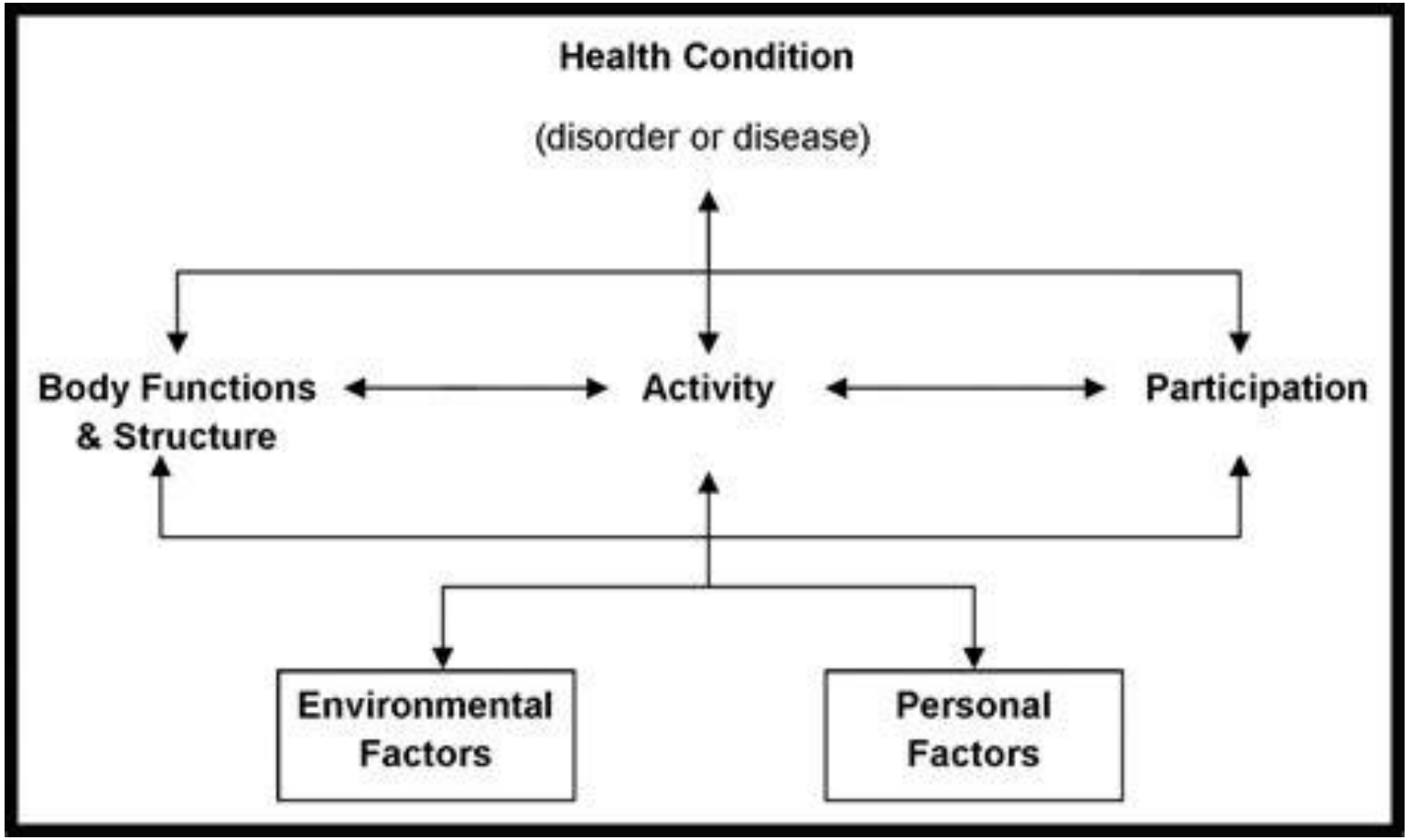
- neurogenic component: overactive muscle contraction
- biomechanical component: stiffening and shortening of the muscle and other soft tissues

(RCP, 2016)

Does it matter?

- Spasticity is one of the defining characteristics of primary lateral sclerosis, but occurs to a variable degree in patients with amyotrophic lateral sclerosis (de Visser, 2019)
- Spasticity was reported by 80% of subjects with ALS (patient reported outcome measure). Greater spasticity results in reduced motor function and quality of life (Milinis et al. 2018)
- In cohort of 150 patients with ALS, 36% presented with spasticity, as assessed by a neurologist. Spasticity accelerates the functional decline of patients. Spasticity-related pain was reported in 42.5% of spastic patients. However, 16.7% of spastic patients presented with significant pain (Verschueren et al., 2021)
- But, spasticity is rarely severe and sometime it helps with function (e.g. mobility/ transfers)

ICF Model



WHO, 2001

Problems related to hypertonia

Loss of joint ROM	Muscle shortening	Impaired movement	Maintaining hygiene	Difficulties with ADLs
Carer burden	Increased dependence	Postural management	Sleep difficulties	QOL
Bulbar symptoms	Pain	Self image	Work/ social interaction	Sexual Relationships

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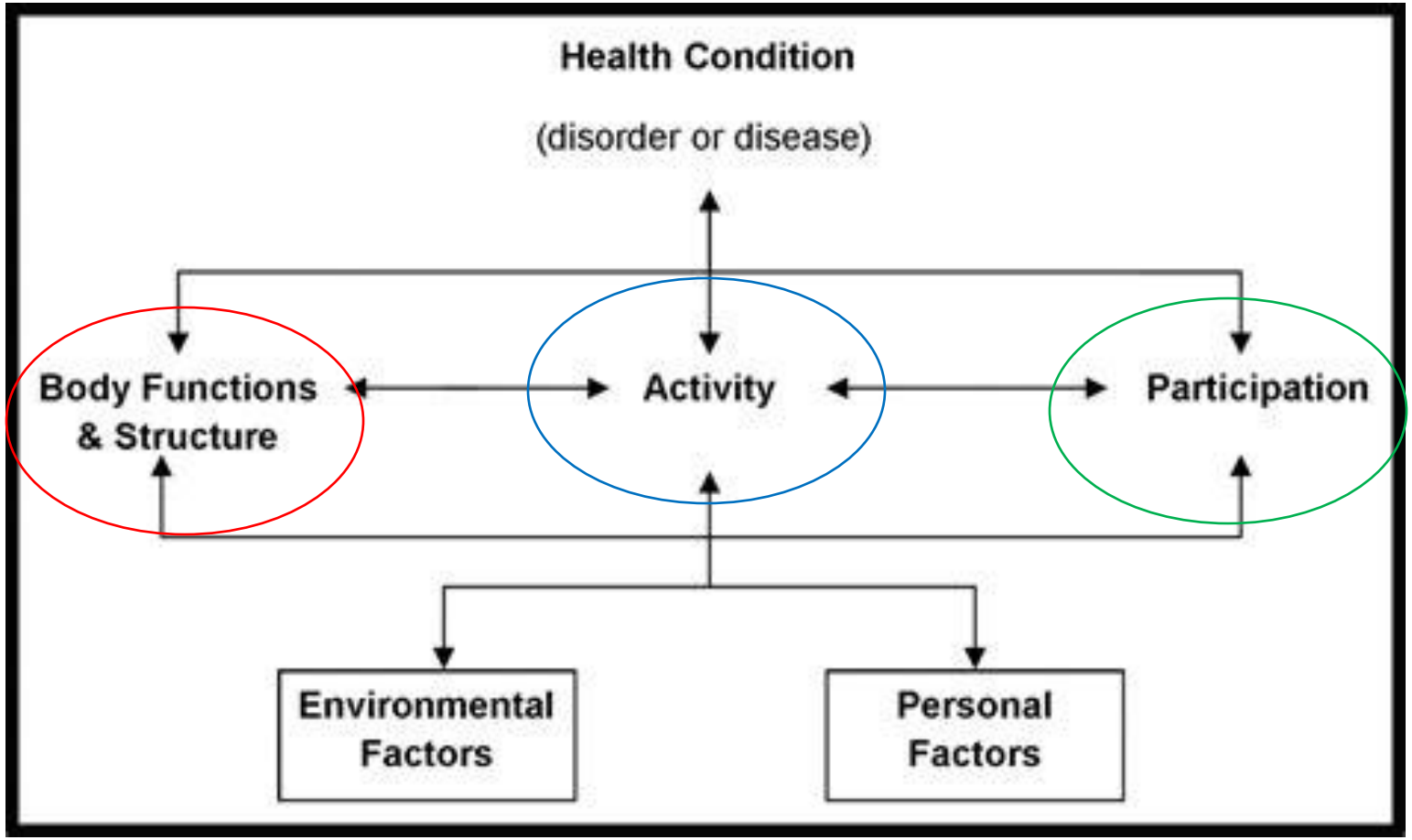

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What does research say?

- **Ashworth et al. (2012)** Cochrane review: Treatment for spasticity in amyotrophic lateral sclerosis/motor neuron disease

Included trials of physical therapy, modalities, prescription medications, non-prescription medications, chemical neurolysis, surgical interventions, and alternative therapies. Primary OM Ashworth or modified Ashworth spasticity scale. Only 1 trial met inclusion criteria- moderate intensity endurance type exercise vs. usual activity. Improvement in spasticity at 3-month in exercise group but weakness in attrition, bias and small sample. Not possible to determine whether individualised moderate-intensity endurance-type exercise was beneficial or harmful.

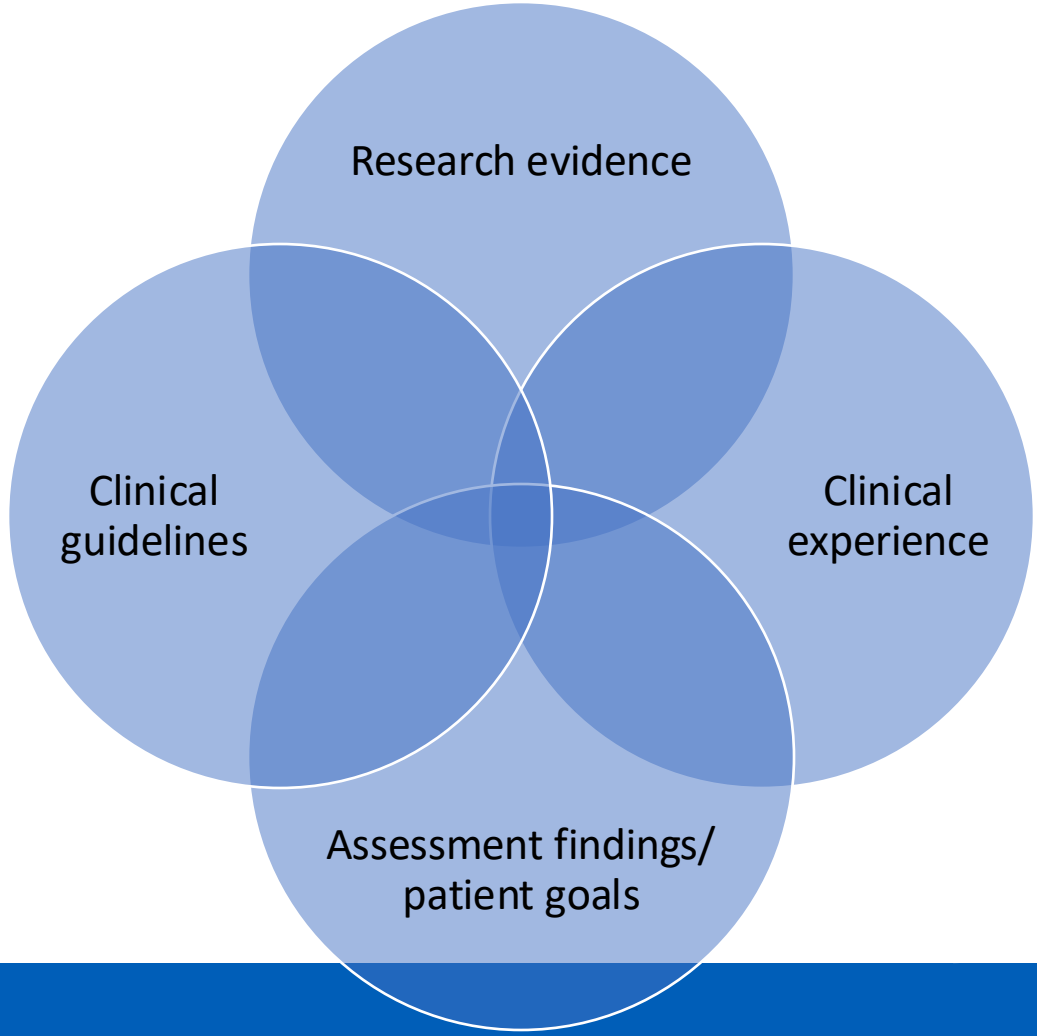
- **Baldinger et al. (2012)** Cochrane review: Treatment for cramps in amyotrophic lateral sclerosis/motor neuron disease

Included studies which looked at any medication or Physical therapy in management of cramps for ALS- 20 studies identified. 1 with cramp as primary end point, 13 with secondary end point, 6 as adverse event. None included physical therapy as therapeutic intervention. There is no evidence to support the use of any intervention for muscle cramps in ALS/MND.

? Anything more recent

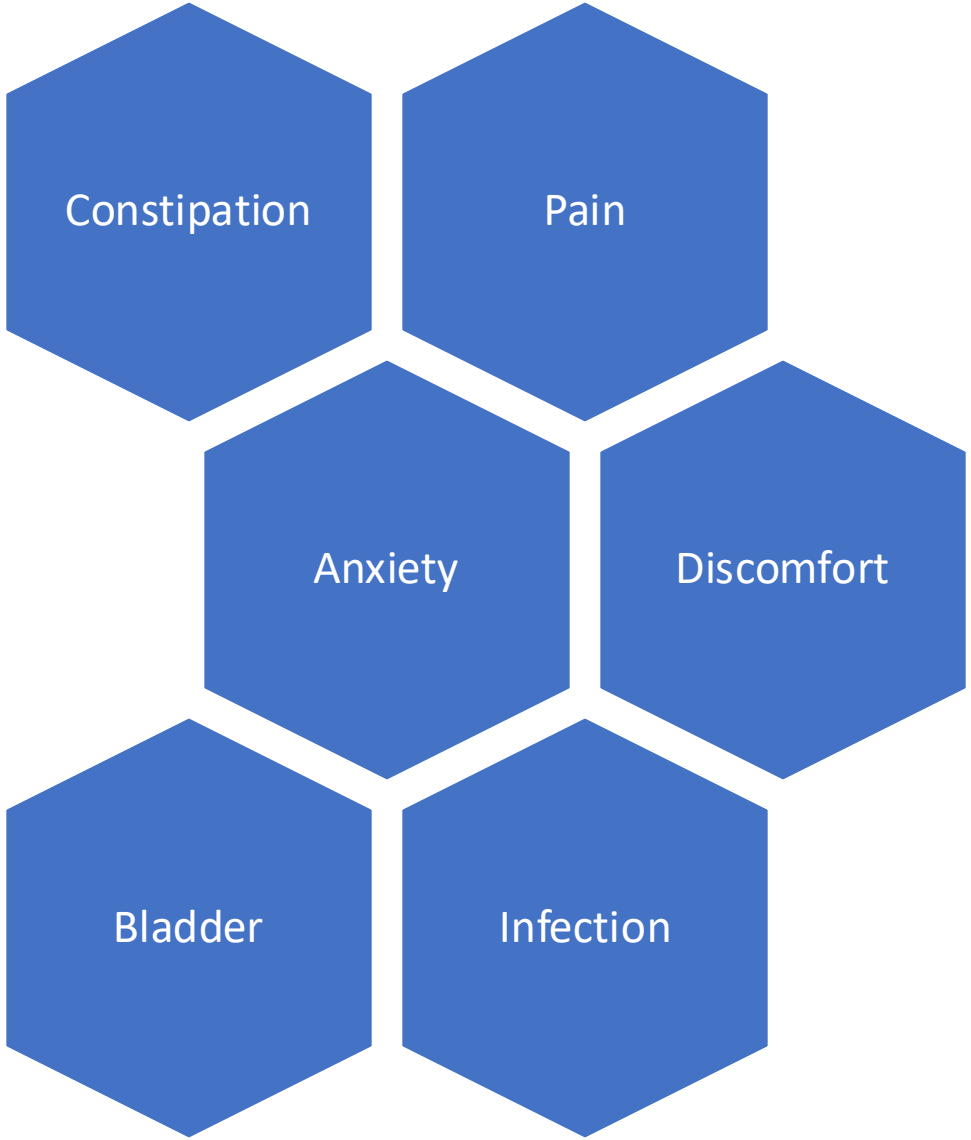
So what…

- There is limited information on the epidemiology, clinical characteristics and treatment of hypertonia in ALS
- Use best available evidence and clinical guidelines
- Accurate assessment & Outcome Measures
- Goal setting- Activity and Participation level on ICF



MDT approach

- A coordinated team approach with a physiotherapist, occupational therapist and medical practitioner is essential to determine the relative role of medication. Consider it’s impact on weakness and fatigue. (MND Australia)
- The multidisciplinary team should assess, manage and review the following areas, including the person's response to treatment…Muscle problems, such as weakness, stiffness and cramps (NICE, 2016)



Consider aggravating factors

Physiotherapy Management

Postural management

Exercise

NICE guidelines (2016):

1.8.5 Consider an exercise programme for people with MND to:

- maintain joint range of movement
- prevent contractures
- reduce stiffness and discomfort
- optimise function and quality of life.

1.8.6 Choose a programme that is appropriate to the person's level of function and tailored to their needs, abilities and preferences. Take into account factors such as postural needs and fatigue. The programme might be a resistance programme, an active-assisted programme or a passive programme.

Although there was initial caution in using strength training in neurological disorders due to the belief that it may exacerbate spasticity, this is now known not to be the case (RCP, 2016)

Limited evidence that exists suggests that to be effective stretch must be applied for several hours per day over a prolonged period – and ongoing in chronic spasticity (RCP, 2016)

Consider goals and individual preference when prescribing exercise

Types of exercise

To splint or not to splint?

- Spasticity, can play a role in the development of non-neural adaptations, seen with decreasing range of movement
- It is rarely possible to deliver hands-on stretching over a sufficient period of time, so splinting and/or casting are often used to provide a more prolonged stretch (RCP, 2016)- specifically in ABI and stroke.
- NICE MND guidelines (2016) 1.8.9 If a person needs orthoses to help with muscle problems, they should be referred to orthotics services without delay, and the orthoses should be provided without delay.
- COT & ACPIN Splint guidelines (2015) suggests that splints should not be used routinely to prevent loss in range of movement, but when passive or active goals identified.
- Consider AFOs to support with joint position/ stability/reduce impact of clonus to improve mobility and transfers

Mobility/ transfer assessments & interventions

- Movement education and facilitated task practice
- Assessment for mobility aids
- Orthoses
- Equipment provision/ referral to OT

Summary

- Assessment!
- Holistic approach
- Goal setting- Active or passive goals.
- MDT management, including reviewing effects of medication
- If not managed correctly, can be disabling
- Sometimes best not to treat!

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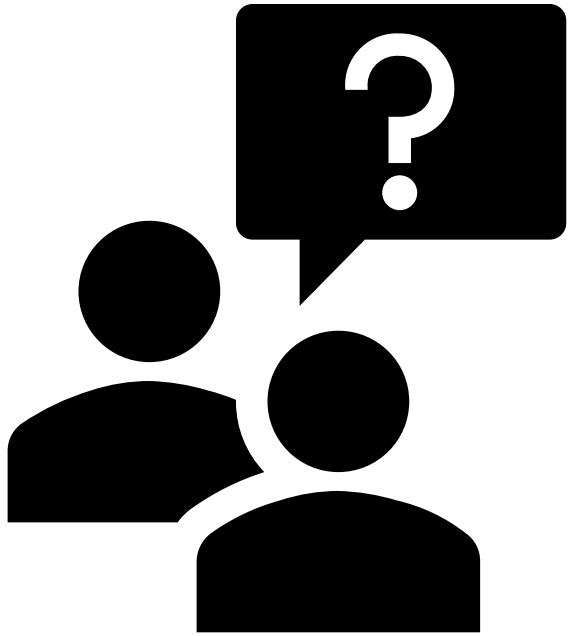

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