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THE UNIVERSITY OF
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Ageing and Frailty

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Down Syndrome Health Conference

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Outline

- Are ageing and frailty the same things?
- Why is frailty important?
- Assessing frailty in people with Down syndrome
- Can you prevent frailty?



What is ageing?

- Just getting older?
 - Chronological age
 - What age?
- Biological age
 - Number of health risk factors assessed
 - Methods vary
 - Weight, blood pressure, diet, exercise, education, social relationships, mood
 - Epigenetic age
 - Estimate of biological age based on changes to DNA methylation



All our bodies change with age

- Decreased vision, hearing, sense of smell
- Thinner skin and hair
- Bones thinner, muscles weaker, wear and tear in joints
- Gum recession, tooth loss
- Bowel and bladder changes
- Sleep patterns change
- Changes in appetite
- Decreased immunity
- Decreased metabolism of medications



Ageing in people with Down syndrome

- Process begins at younger age
 - Progression of existing hearing and vision impairments
 - Osteoporosis
 - Premature wrinkling
 - Early menopause
 - Reduced immunity
 - Early onset dementia
- Some evidence that Trisomy 21 increases biological age of tissues e.g. brain, blood

Horvath et al., 2015



Everyone ages

BUT.....

Not every older person is frail



What is frailty?

- Physiological decline in late life
- Increased medical complexity
- More vulnerable to adverse health outcomes
 - Less able to “bounce back” from acute illness or trauma than non-frail people



Why is frailty important?

- Affects quality of life and activities of daily living
- Increased / longer hospital admissions
- Loss of independence
 - Need for greater intensity of care
 - Placement in high support facilities
- Predicts mortality



Testing for Frailty

- Multiple tools used in general population
- Some features to look for
 - Weight loss
 - Muscle mass and strength
 - Walking speed
 - Number of medications
 - Decline in Activities of Daily Living
- Some of these measures not appropriate or difficult to do in people with Down syndrome



Accumulation of Deficits Approach

- Increasingly used in general population and mostly used in people with intellectual disability
- How many health conditions, impairments and risk factors a person has
 - Physical, psychological, social, functional factors
 - e.g high BP, diabetes, falls, weight loss, dementia, difficulties with ADLs, fatigue, social isolation, polypharmacy
- The more of these “deficits” a person has, the more the likelihood of being frail

Frailty Index

- Identify how many deficits a person has
- Divide this number by the total of all possible deficits = Frailty Index (FI)
- Generally, a FI of more than 0.2-0.22
- For example:
 - Frailty Index of 44 items
 - If a person has 19 of these
$$FI = 19/44 = 0.43$$
 - the person has frailty



Frailty in people with intellectual disability

- No studies specifically in people with Down syndrome
- Frailty related to older age, having Down syndrome (2 studies), female gender, level of intellectual disability
- Social supports protective in one study (living with family vs living alone)



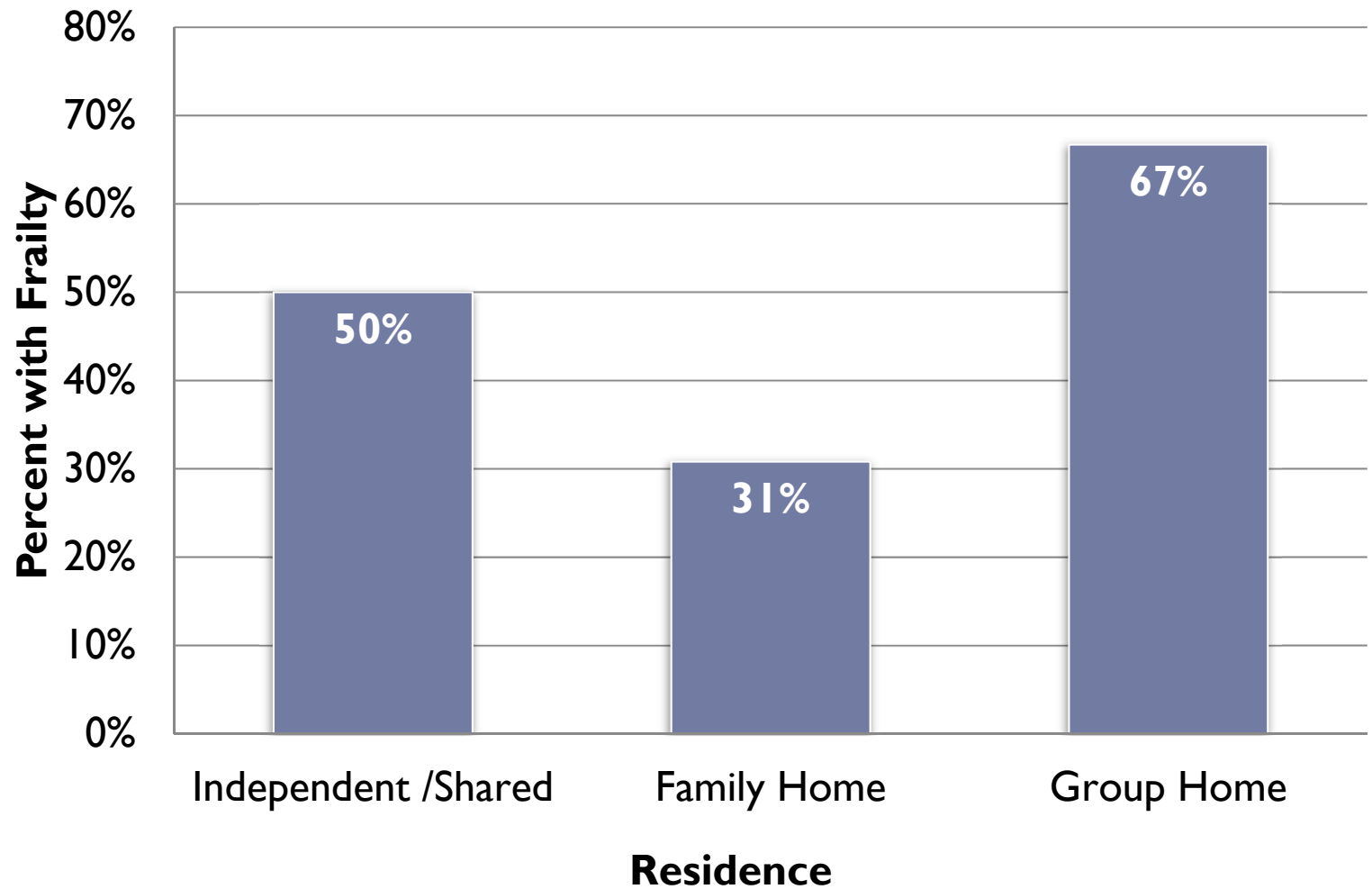
Frailty in a Clinic Population

- Aim - develop and evaluate FI, identify who is at risk, identify pre-frailty and evaluate interventions to delay or prevent progression to frailty
- Adults attending specialised multidisciplinary health clinic for people with intellectual disability and complex co-morbidities
- Frailty index (FI) developed
 - Accumulation of deficits approach used
 - 44 items - Routinely collected clinical data
 - Defined frailty as $FI > 0.2$

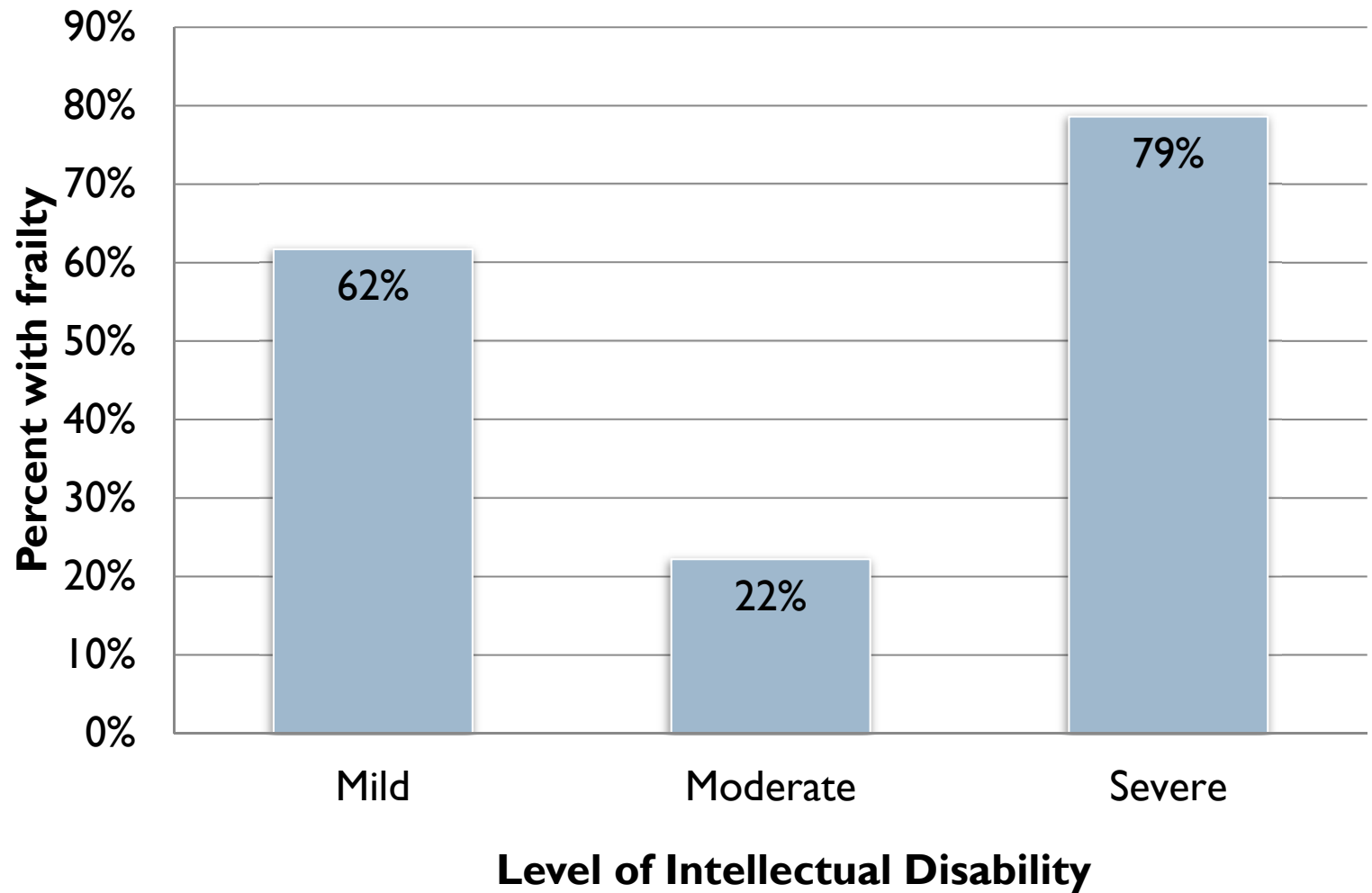
Results

- 58 people evaluated
 - FI Range: 0.0 - 0.49
 - Mean FI = 0.21
 - 48.3% were frail
 - 59.3% females were frail
 - Those with frailty were older
 - Mean age of frail group was 40.6 years
 - Mean age of non-frail group 29.7 years
- $t(56) = 3.11, p=0.003$

Residential Type and Frailty



Level of Intellectual Disability and Frailty



Main Conditions and Frailty

Main Diagnosis	Frail	Non-Frail	Total	Percent frail
Down syndrome	5	8	13	38.5%
Other syndromes/ chromosomal disorders	6	3	9	66.7%
Cerebral Palsy	8	0	8	100%
Autism	3	10	13	23.1%



Can you prevent Frailty?

- Similar strategies as for healthy ageing
- Good nutrition
- Regular physical activity including maintaining muscle strength
 - Cardiac fitness, resistance, balance, flexibility
- Medication Review
- Social engagement / meaningful activity
- Social and functional supports



Summary

- Everyone ages!
- People with Down syndrome experience conditions of ageing at an earlier age
- Frailty is not inevitable with ageing in people with Down syndrome
- Strategies for healthy ageing are likely to also delay or prevent progression to frailty