

A Preliminary Study of Variation In Heavy Metal Concentrations Among Brain Donors With and Without ADRD Neuropathology

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BACKGROUND

- Heavy metals are an omnipresent **neurotoxicant**, particularly in disadvantaged communities.
- Heavy metals** are associated with **Alzheimer’s disease and related dementias** (ADRD).
- Timing** and **dosage** of metal exposures and patterns of accumulation unclear.
- Existing studies focus on single metals or brain regions, or biofluids.

OBJECTIVE

Using an applied toxicology and exposomic approach we examine differential heavy metal accumulation in three brain regions in the context of donors’ lived experiences.

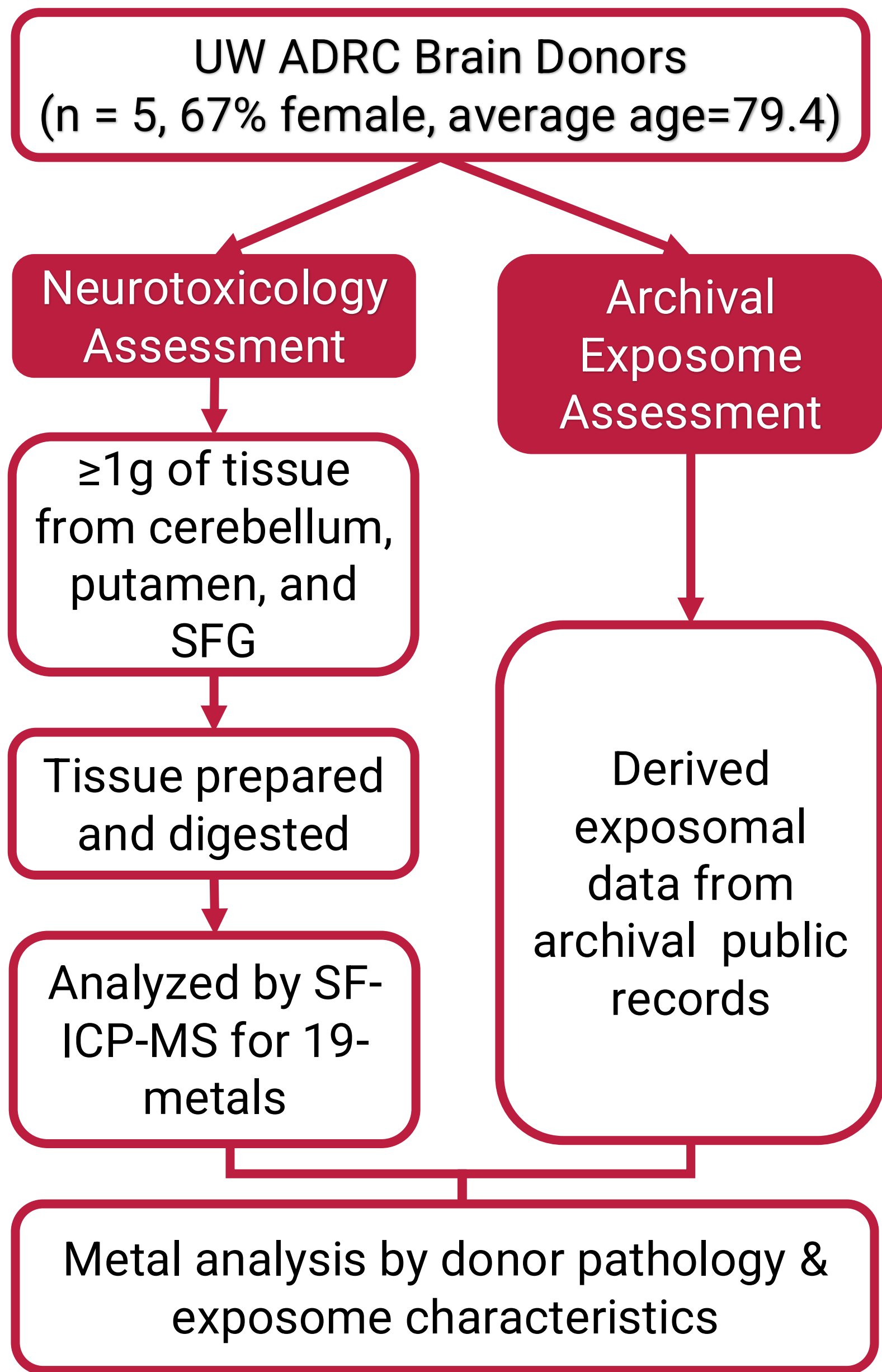
FUTURE DIRECTIONS

- Utilize **nationally representative** brain bank cohorts
- Incorporate life-course residential history
- Include measures of the occupational and military exposome

CONCLUSION

- Quantifying metal concentrations in historically banked human brain tissues is **feasible**
- Metals accumulate differently by brain region
- Donors with ADRD neuropathology show differences in metal accumulation
- An **exposomic framework** allows for novel data extraction and integration
- Opportunity to **examine life-course social and environmental exposures**

METHODS



Brain donors with **ADRD neuropathology** show **elevated levels of lead, mercury, cadmium, and copper.**

APPLIED NEUROTOXICOLOGY RESULTS

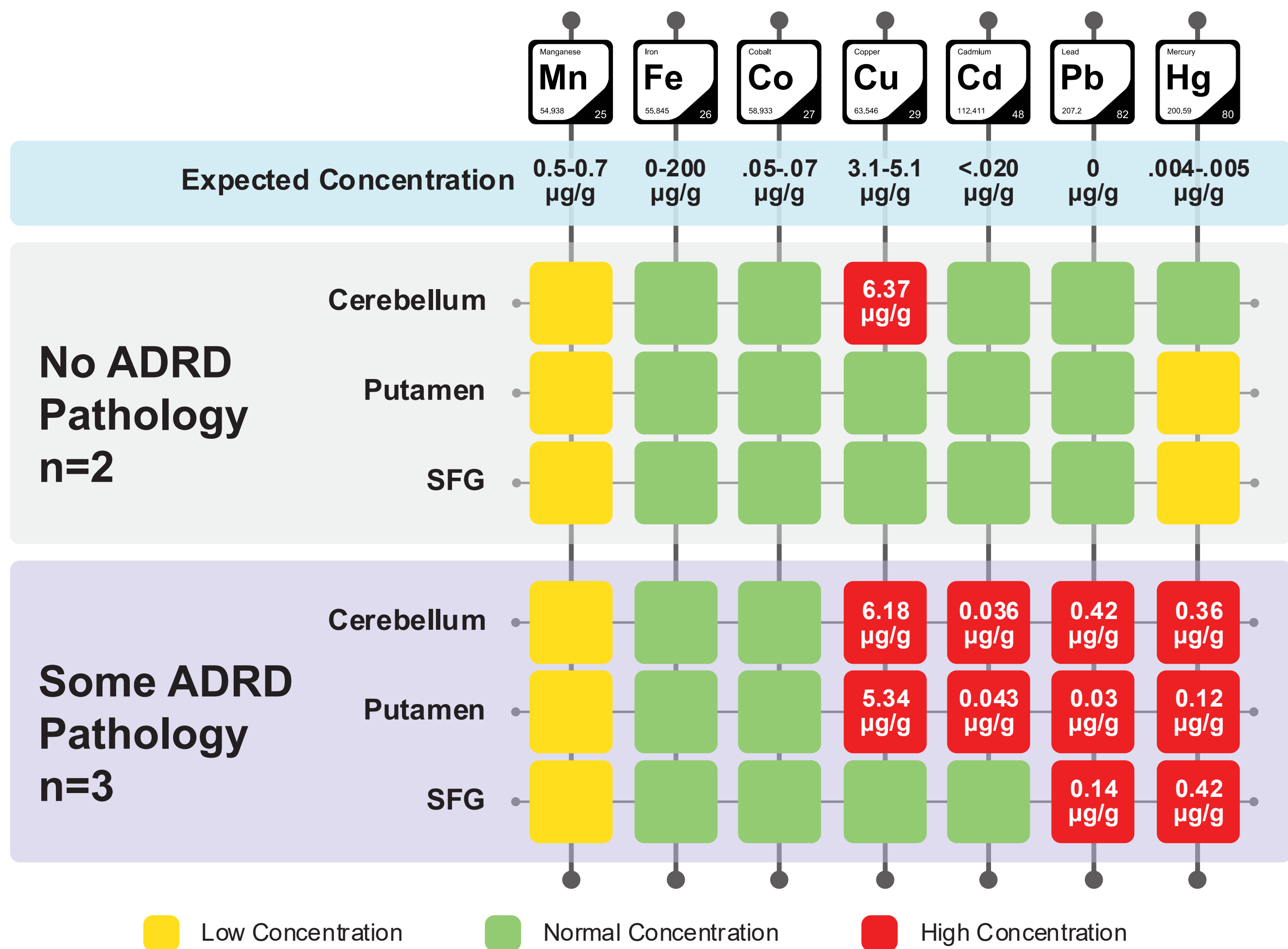


Figure 1. Selected Metal Concentrations from Brain Donors with and without ADRD Pathology. This figure illustrates seven of the 19 metals examined in this study. The concentration of these metals was assessed in two groups of individuals: those without ADRD pathology (n=2) and those with ADRD pathology (n=3). Concentrations noted in the figure are group-level averages.

ARCHIVAL EXPOSOMAL RESULTS

Farmer

Age: 81 Sex: Male
ADRD Pathology: No
Marital Status: Married
Education: High school
Median life-course ADI: 9

Teacher

Age: 89 Sex: Female
ADRD Pathology: Yes
Marital Status: Married
Education: College
Median life-course ADI: 9

Industrial Manufacturing

Age: 90+ Sex: Male
ADRD Pathology: Yes
Marital Status: Married
Education: High School
Median life-course ADI: 11

Teacher

Age: 69 Sex: Female
ADRD Pathology: Yes
Marital Status: Married
Education: Graduate School
Median life-course ADI: 31

Cleric

Age: 56 Sex: Female
ADRD Pathology: No
Marital Status: Unknown
Education: Associate’s Degree
Median life-course ADI: 11

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