

Chemistry of Dementia Risk Factors Course & Community-Based Prevention Strategies

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Intergenerational Learning as a Model to Translate Dementia Science into Community Action

INTRODUCTION

The Lancet Commission identified 14 modifiable risk factors for dementia onset, where 45% of cases could be prevented or delayed.¹ Additionally, the US POINTER study found structured interventions to improve cognitive ability.² There remains a gap between scientific knowledge and public awareness. Community-engaged education may improve understanding of dementia risk reduction and promote health behaviors among senior citizens.

METHODS

A college-level course was developed where undergraduates learned chemical mechanisms of 14 Dementia Risk Factors (*Lancet*, 2024) and led weekly, interactive sessions at a local senior center. Senior citizens were surveyed on their confidence about each risk factor pre and post student-led lesson.

Undergraduates Learn Dementia Biology

Develop Educational Materials & Engage Senior Citizens

Mutual Learning & Community Feedback

Measure Understanding of Dementia Risk Reduction

10 weeks

RESULTS

Undergraduates: 39

Student Career Status	Number (n)
Accepted medical school	3
Prospective medical/dental school	34
Other career tracks (direct employment)	2

Student reflection themes: Recognition of health disparities, impact of community-engagement, relationship building, science communication, greater understanding of dementia prevention, mutual learning

Senior citizens: 35

Risk Factor	Pre	Post
Smoking	3.5	4.5
Obesity	3.0	4.5
Physical Inactivity	3.0	4.5
Low Education	3.0	4.5
Vision Loss	3.0	4.5
Hearing Loss	3.0	4.5
Depression	3.0	4.5
Social Isolation	3.0	4.5
High LDL Cholesterol	3.0	4.5
Head Injury	3.0	4.5
Alcohol Intake	3.0	4.5
Hypertension	3.0	4.5
Diabetes	3.0	4.5
Air Pollution	3.0	4.5

Average Confidence (1-5)

Attendance rate: 79±9%

Activity examples: tai chi session, sleep apnea bingo, small-group discussion, fresh produce pickup, nutritional exercises, blood pressure screenings, air pollution catcher, experiments

CONCLUSIONS

Community-engaged chemistry education can serve as a bidirectional model for translating dementia prevention science into accessible public health interventions while simultaneously training future physicians and scientists in science communication and community partnership.

Lessons learned:

- Senior citizens preferred interactive activities and physical handouts
- Both seniors and students reported community-engagement improved their learning of dementia prevention
- Students benefitted from repeated opportunities to practice science communication and build rapport
- Community feedback improved educational material design

Future: expand to additional senior centers, develop culturally tailored interventions, measure long-term behavior change, collaborate with Philadelphia Corporation of Aging (PCA) and Pennsylvania State Alzheimer's Disease and Related Dementias (ADRD) office

REFERENCES

- (1) Livingston G, Huntley J, Liu K et al. Dementia prevention, intervention, and care: 2024 report of the *Lancet* standing Commission, The Lancet, 2024; 404, 572-628
- (2) Baker LD, Espeland MA, Whitmer RA, et al. Structured vs Self-Guided Multidomain Lifestyle Interventions for Global Cognitive Function: The US POINTER Randomized Clinical Trial. *JAMA*. 2025;334(8):681–691. doi:10.1001/jama.2025.12923

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