

Initial Development of an Elder Mistreatment Risk Assessment Model: A Explanatory Sequential Mixed-Methods Study

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OUTLINE

Background on EM and Risk Factors

Risk Model Development

Integration of Qualitative Data

Development of Screening and Intervention Tool

Important Considerations

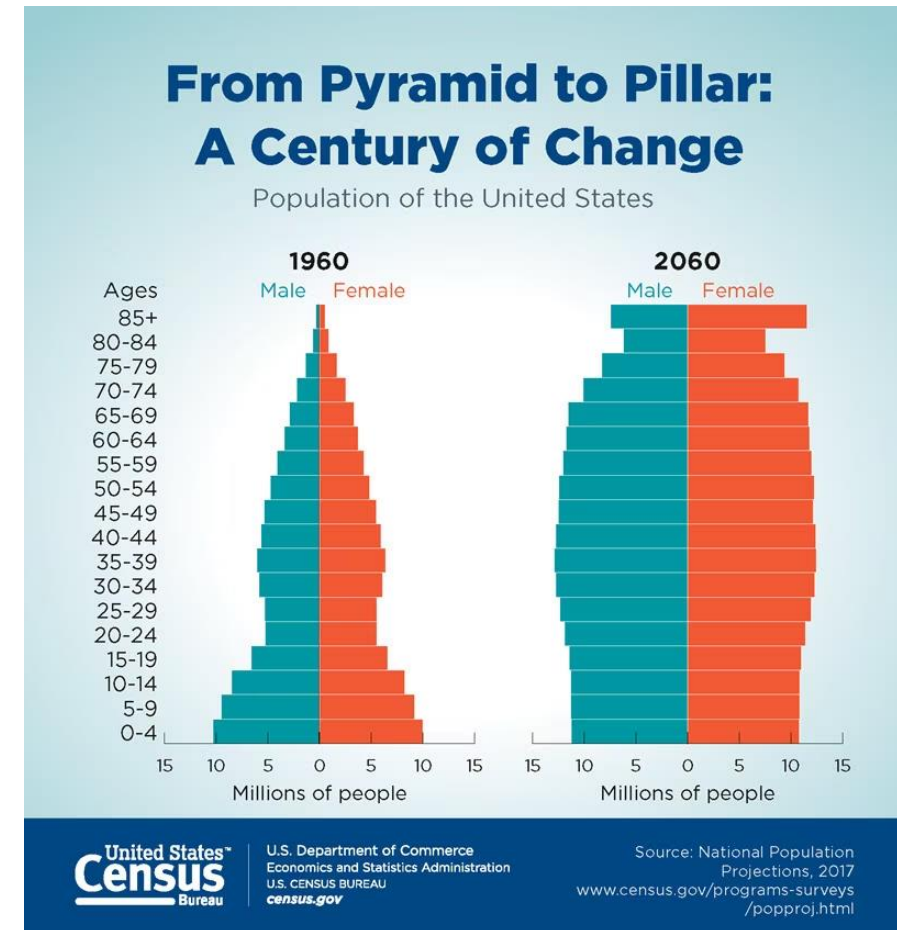


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Older Adult Population is Rapidly Growing

- By 2030, 1 in 5 will be 65 years or older.¹
- An estimated 10-47% of the aging older adult population has experienced elder mistreatment (EM).^{2,3}
- EM includes physical, sexual, emotional, and financial abuse, neglect, and abandonment.³
- Older adults with cognitive impairments and ADRD are at an increased risk of experiencing EM.⁴



Impact of EM on Outcomes

- EM may be significantly associated with negative health impacts resulting in adverse outcomes⁵⁻¹¹:
 - ED visits
 - SNF Hospitalizations
 - Unplanned Readmission and Mortality.
- Limited evidence exist on the impact of EM among older Medicare beneficiaries.¹²⁻¹⁴

EM Risk Factors¹²

- **Conditions identified:** Psychiatric diagnoses, Dementia, Lipid abnormalities and heart failure, Skin ulcers, Sepsis, Economic and Psychosocial problem
- **Comorbidities (any abuse):** hypertension (67.7%), Depression (44.6%), Fluid and electrolyte disorder (43.6%), Cardiac Arrhythmias (28.2%), and Diabetes (28.00%)
- **Comorbidities in top 5:** COPD (psychological, sexual, and neglect), neurological disorder (sexual), weight loss (neglect)
- **Comorbidities (Primary abuse):** mood disorders, delirium/dementia, schizophrenia

Objectives

- To evaluate risk models of elder mistreatment (EM) based on logistic regression and machine learning methods using national Medicare data.
- Integrate input from adults with MCI/ADRD, caregivers, and clinicians, and topical experts to guide the development of brief EM risk screening tool and caregiver risk assessment as well as intervention.

Methods – Evaluation of EM Risk Models



- **Data Source**: 20% Medicare database [2015-2018]
 - Master Beneficiary Summary File
 - MBSF Chronic Conditions Segment
 - Diagnosis and Procedure codes from Carrier, Outpatient, and MedPAR claims files
 - Prescription Drug Information from the Part D event files
- All beneficiaries included, including a subgroup with ADRD.

Methods – Evaluation of EM Risk Models



■ Study Cohort:

- Older adults aged 66+ in 2016
- Without a prior EA diagnosis in 2015 and 2016
- Medicare parts A, B, and D coverage without HMO in 2015/2016
- Alive at the end of 2016
- Medicare eligible through the end of 2018.

Methods – Evaluation of EM Risk Models



Predictor variables:

- Demographics (e.g., age, sex, race, etc.)
- CCW Chronic Conditions (e.g., diabetes, depression, cardiovascular disease, etc.)
- Symptoms (e.g., general, skin, gait abnormality, etc.)
- Injury or trauma history,
- Claims-based frailty score (0-1),
- medical screening and procedures (e.g., X-ray), and
- **social determinants of health (SDoH;** e.g., marital problems, housing/income, etc.).

Outcome variable:

- Elder mistreatment diagnosis [2017-2018]
 - T74.0-T74.3, T74.5, T74.9, T76.0-T763, T76.5, T76.9, Z65.8, Z65.9
 - Abuse not otherwise specified (NOS; T74.9, T76.9); physical abuse (T74.1, T76.1); psychological abuse (T74.3, T76.3); sexual abuse (T74.2, T74.5, T76.2, T76.5); neglect (T74.0, T76.0); and psychosocial circumstances [e.g., codependency, spiritual problems, seeking and accepting known hazardous and harmful behavioral/psychological or physical interventions (Z65.9, Z65.8)].

Analysis – Evaluation of EM Risk Models



- Three cohorts were created: training (50%), testing (25%), and validation (25%).
- Four models considered demographics, + comorbidities, + symptoms, and +social/medical factors.
- EA models used logistic regression and machine learning methods (random forest, gradient-boosted tree classification, and multilayer perceptron classification).
- To compare methods: AUC, percent agreement, recall, purity, and f-measure. ROC curves were created for each method.

Included Sample

Step	N
Medicare Beneficiaries in 2015-2016	4,874,475
Age 66+ in 2016	3,732,097
A/B/D Eligible with no HMO 2015-2016	2,924,933
Alive at the end of 2016	2,910,579
Had eligibility through 2018	2,346,804
No EM Diagnosis in 2016-2015	2,261,166
ADRD Diagnosis	187,805
EM Diagnosis	4,648

Model Metrics Comparison

Type	Cutpoint Number	EM - Observed								
		Yes	No		AUC	Sensitivity	Specificity	GINI Impurity	F Measure	Agreement
Logistic Regression - Full Model	0.0009	Yes	643	300,673	0.7253	0.8007	0.4672	0.4976	0.0043	46.77%
		No	160	263,700						
Logistic Regression - Selected Model	0.0009	Yes	643	304,731	0.7227	0.8007	0.4601	0.4966	0.0042	46.05%
		No	160	259,642						
Random Forest	0.0010	Yes	695	324,957	0.7058	0.8119	0.4247	0.4874	0.0043	42.53%
		No	161	239,875						
Gradient Boosted Trees	0.0240	Yes	690	325,163	0.6989	0.8061	0.4243	0.4873	0.0042	42.49%
		No	166	239,669						
Multilayer Perceptron Classifier	0.0008	Yes	690	309,045	0.6995	0.8061	0.4529	0.4943	0.0044	45.34%
		No	166	255,787						
Logistic Regression - ADRD Subgroup	0.0024	Yes	130	27,359	0.6597	0.8025	0.4179	0.4863	0.0094	41.92%
		No	32	19,640						

Risk Factors of EM within two years (Full Sample)

INCREASED EM risk

1. **Primary Support Issues** [3.55 (2.36, 5.34)]
2. **Housing and Income Problems** [2.70 (1.59, 4.61)]
3. Learning Disabilities [2.35 (1.15, 4.78)]
4. STI Testing [2.25 (1.44, 3.53)]
5. Lung Cancer [1.93 (1.34, 2.78)]
6. **Social Environment Problems** [1.91 (1.09, 3.35)]
7. Alcohol Use Disorders [1.64 (1.26, 2.14)]
8. **Marital Problem** [1.59 (1.25, 2.01)]
9. Personality Disorders [1.55 (1.16, 2.08)]
10. Medicaid Dual Eligibility [1.54 (1.35, 1.75)]

DECREASED EM risk

1. Hip Fracture [0.43 (0.22, 0.82)]
2. Depression Screening [0.72 (0.53, 0.97)]
3. Old Age (vs Disability) [0.72 (0.63, 0.83)]
4. Cataracts [0.80 (0.70, 0.91)]
5. Hyperlipidemia [0.80 (0.72, 0.90)]
6. Hypertension [0.84 (0.74, 0.96)]

Other increased EM risk factors: frailty, liver disease, leukemia/lymphoma, hepatitis, general symptoms, anxiety, ulcers, Black race, bipolar disorders, CKD, abnormal weight loss, depressive disorders, and skin symptoms.

Risk Factors of EM within two years (ADRD Sample)

Variable	Level	Reference	Logistic 2 year OR (95% CI)
Sex	Male	Female	1.26 (1.15, 1.38)
Medicaid Dual Eligibility	Yes	No	0.96 (0.88, 1.04)
Age	71-75	≤70	1.25 (1.08, 1.46)
	76-80		0.92 (0.79, 1.08)
	81-85		0.67 (0.56, 0.80)
	85+		0.65 (0.56, 0.76)
Cataracts	Yes	No	1.20 (1.00, 1.44)
Cancer Prostate	Yes	No	1.29 (0.90, 1.85)
Cancer Lung	Yes	No	2.04 (1.13, 3.67)
Benign Prostatic Hyperplasia	Yes	No	1.05 (0.82, 1.35)
PTSD	Yes	No	1.64 (1.13, 2.36)
Frailty Score	Per 0.01 Increase		1.03 (1.01, 1.05)
Marital Problem	Yes	No	1.97 (1.39, 2.78)
Housing and Income Problems	Yes	No	2.48 (1.21, 5.11)

Qualitative Input from persons with lived experience (MCI/ADRD), caregivers, and healthcare providers/personnel

Persons w/ MCI/ADRD

- Positive and negative factors for elder mistreatment
- Relationship experiences
- Emotional and social needs
- Healthcare experiences

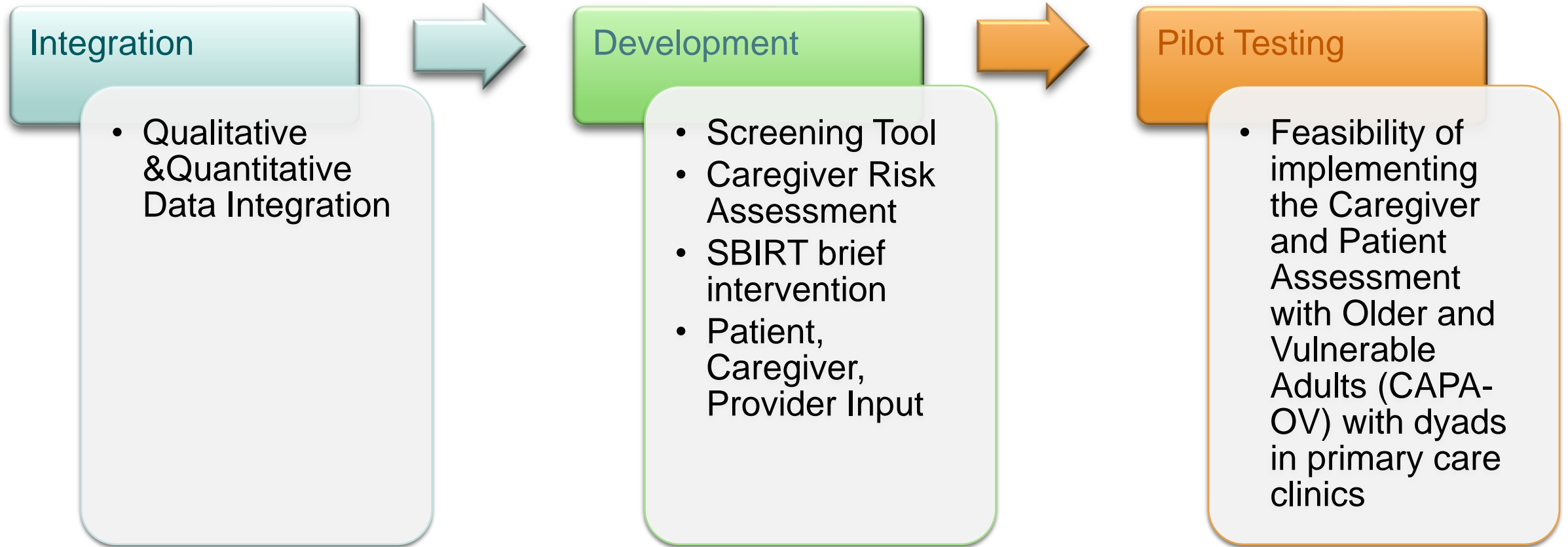
Caregivers

- Caregiving experiences
- Sources of stress
- Strategies to reduce stress
- Knowledge of elder mistreatment
- Challenges with seeking care or support

Healthcare Providers

- Review modified EM tools
- Review risk models of elder mistreatment
- Needs and barriers to implement screening
- Guidance on screening and treatment protocols
- Best practices in referral for treatment

Screening Tool and Intervention Development



Important Considerations

- Incorporation of social determinants of health, health status (physical and mental), and substance use history as risk factors of EM.
- Most existing measures have not considered specificity and sensitivity. We focused on sensitivity for the creation of the measure.
- Cultural perceptions of elder mistreatment should be considered for both persons with MCI/ADRD and caregivers.
- Providing education and referral supports to healthcare personnel may facilitate screening in settings with low-screening rates.
- Further evaluation is needed that incorporate other factors not included, such as social support, using Medicare claims and assessment data, to improve EM prediction model.

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THANK YOU

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