- Noticed Research Activities and Funding Project, NIH/NIA

"advances our understanding of the determinants, outcomes, and amelioration of later life disability"

AIM: Use de-identified electronic health data UCSF to address aging related phenomena that are:

1. Clinically burdensome (frequent hard to manage)

2. Economically draining (Increase LOS, leads to readmission or complications that aren't reimbursed, require high labor/resource use, labeled hospital acquired condition)

3. Quality-of-life destroying

Options.

1. Delirium

2. Falls(considered preventable CMS 'never events') and Fractures

3. Dementia

4. Incontinence

5. Polypharmacy and Adverse Drug Events

6. Readmissions in Frail Older Adults

7. Pressure Ulcers (Hospital Acquired)

#	Analysis (Research Question)	Key Variables (EHR)	Primary Method (Book chapter §)	Why It Matters / Deliverable
1	**Incidence & case-mix description** – What proportion of ≥65 y inpatients develop delirium, and how does it vary by service line?	Age, service, ICD-10 delirium code, admission type	One-/two-variable summaries & stratified proportions (§2.3–2.4)	Baseline burden estimate; informs sample size for later models.
2	**Risk-factor screening score** – Which admission-day factors best predict delirium?	Baseline vitals, labs, medication list, dementia flag, sensory impairment	Multiple logistic regression (§5.2) → risk score	Generates a bedside “high-risk” flag; ROC/AUC report.

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3	**Time-to-onset** – How quickly does delirium occur after admission and which factors hasten it?	Time stamps for admission, first positive CAM/ICD code; covariates	Cox proportional hazards model (§6.2)	Adjusted hazard ratios; survival curves by risk strata.
4	**Length-of-stay penalty** – How much extra LOS is attributable to delirium after controlling for confounders?	LOS (days), delirium status, comorbidity score, DRG	GLM with log-link & gamma dist. (§8.1–8.3) or linear regression on log(LOS) (§4)	Incremental cost day estimate; feed to cost model.
5	**30-day readmission risk** – Does delirium independently predict Medicare readmission penalties?	Readmission indicator, delirium, index LOS, discharge dispo	Logistic regression + LRT (§5.2.1, 5.2.5)	Odds ratios; c-statistic; showcases hospital financial risk.
6	**In-hospital mortality mediation** – Is the LOS increase partly mediating the delirium–mortality link?	Mortality flag, delirium, LOS	Mediation analysis (§4.5	§5.2.3)
7	**Interrupted time-series of protocol rollout** – Did a new delirium-prevention bundle reduce incidence?	Monthly incidence pre/post rollout date	Segmented regression (GLM with time & phase terms; §8.3)	Level & slope change; evidence for causal impact.
8	**Competing-risks discharge** – Among delirious patients, is discharge to SNF vs home predicted by baseline frailty?	Discharge destination, frailty index, delirium onset day	Competing-risks Fine-Gray model (§6.5)	Sub-distribution HRs inform care-transition planning.
9	**Repeated measures trajectory** – How do daily Mobility/CAM scores evolve before, during, after delirium?	Daily CAM, mobility scale, day index	Linear mixed model / GEE (§7.3–7.4)	Population-level trajectory plot; targets rehab timing.
10	**Causal effect via IPTW** – Estimate average treatment effect of early mobilization orders on delirium using inverse probability weighting.	Mobilization order within 24 h, delirium, confounders	Marginal structural model with IPTW (§9.1–9.4)	Provides quasi-experimental evidence for an actionable intervention.