# Administrative Data in Foster Care:
## *An Aggregate Approach*

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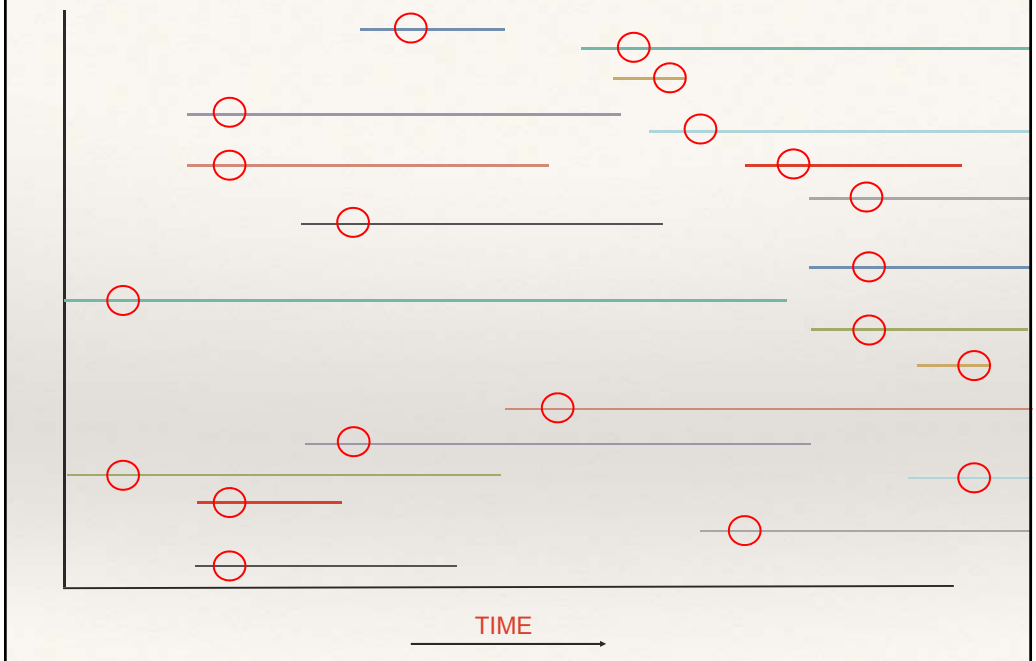
## Principles of the foster care system and structure of administrative foster care data

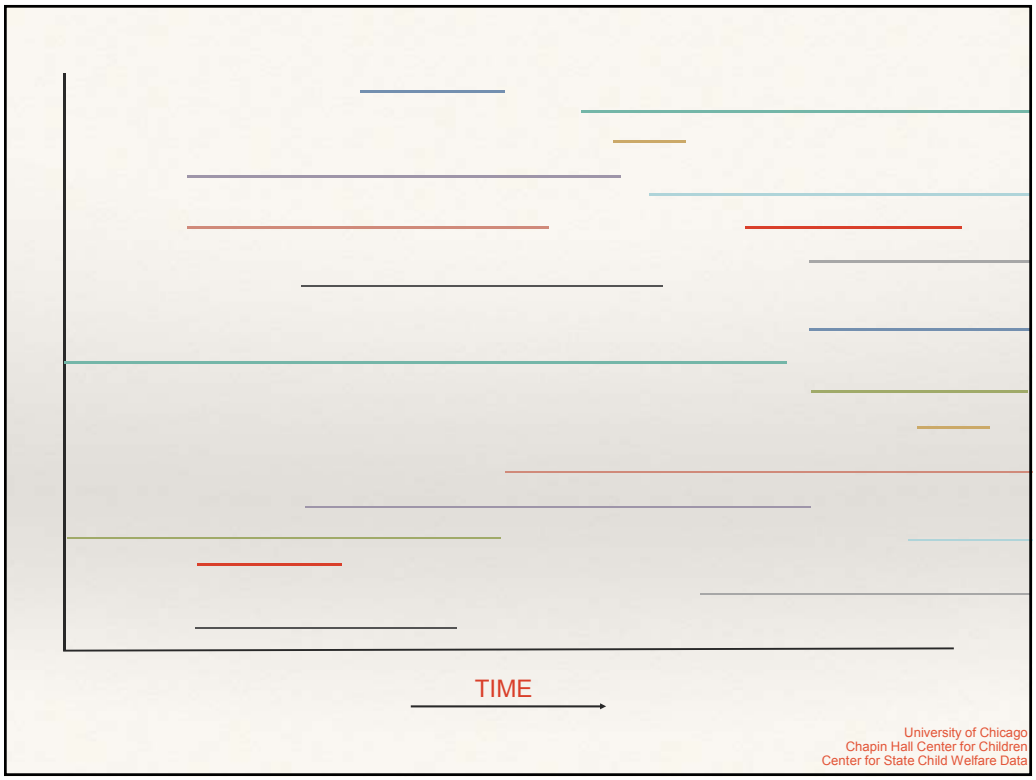
- Foster care is a state intervention to provide care for children who cannot be housed in the home of their parents (typically for reasons of abuse and neglect).
- At any given time there are approximately 400,000 children in foster care (AFCARS, 2016).
- Agencies responsible for these interventions track, in minute detail on a case level and daily basis, placements, services, and other activities for each foster placement.
  - *Risk management*
  - *Reimbursement*
  - *Caseload management*

# Entries and Exits

- Children are placed in foster care (*Enter*); stay for some period of time; and then are released from foster care (*Exit*).
- Nationally, in FY2015 (AFCARS, 2016):
  - 269,509 children entered care
  - 243,060 children exited care
  - A point in time count found 427,910 children in care
  - Considerable churn in these populations
- The period of placement in foster care between an entry and an exit is referred to as a "spell."






TIME
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Length of Stay
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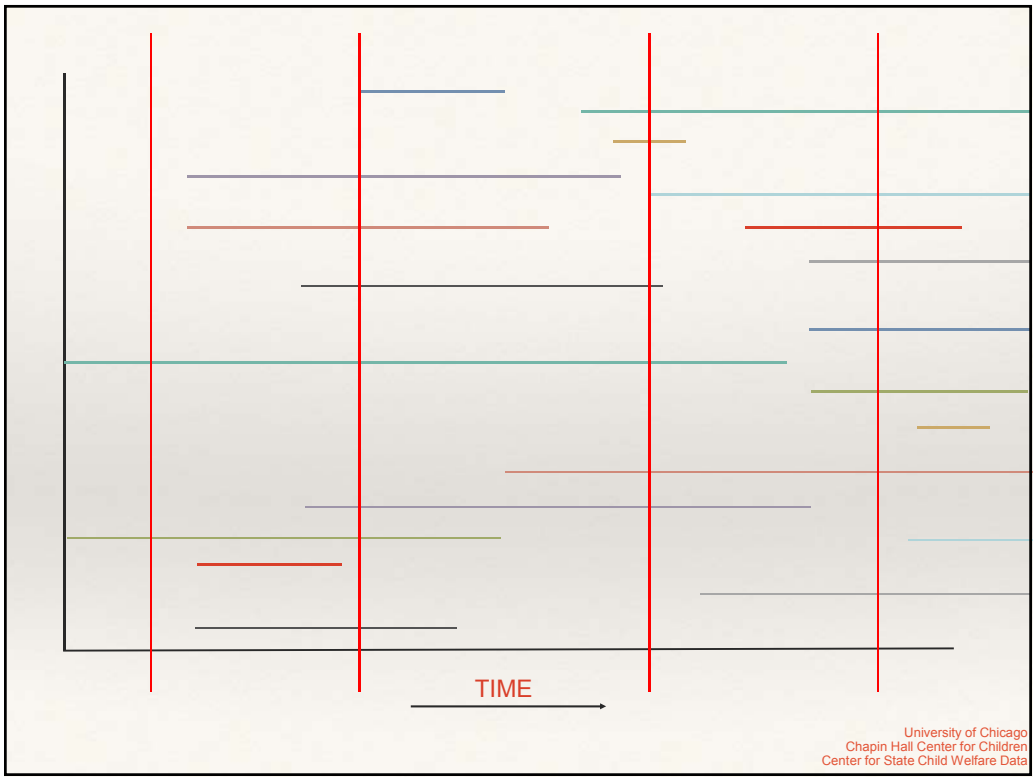




# Population-based analysis

- The tendency toward individual-level explanations of social phenomena may veil important population-level dynamics.
- Is the behavior (or to what degree is the behavior) of the population reducible to individual-level decisions?
- Are there properties of the population which are not easily explained by aggregating individuals?
- What can population-based analysis reveal about structures which bound individual-level decisions?

# Modeling systems through coupled difference equations with annotations

X is the number of entries/admissions; Y is the number of exits/discharges

Future state of variable (dynamic time series analysis)

Functional relationship between present state of variable and future state of variable

$$X(t+1) = X(t)[r_x - r_x X(t) - \beta_{x,y} Y(t)]$$
$$Y(t+1) = Y(t)[r_y - r_y Y(t) - \beta_{y,x} X(t)]$$

**Rate** parameter

**Capacity** parameter

**Coupling**: the $x$ variable occurs in the $y$ equation (and vice versa)

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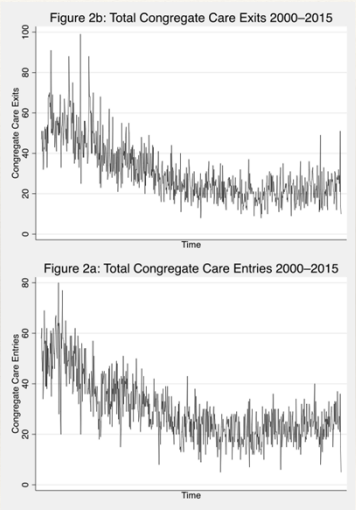
# Capacity and Resource Dependence: An Example from Congregate Care

- Congregate care is a type of foster care where children are placed in a group setting.
- Resources in congregate care are relatively inelastic in relation to demand over the short term
  - It takes time and money to put a bed on line
  - Fixed costs in built, institutional settings
  - This inelasticity may produce capacity constraints
  - Staffing levels must be maintained
  - Buildings cost money to maintain and operate
- We can expect to see these constraints manifest themselves within the dynamics of a time series.

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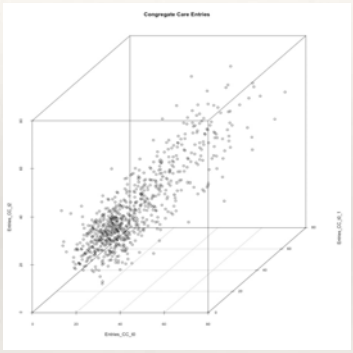
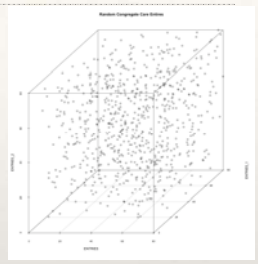
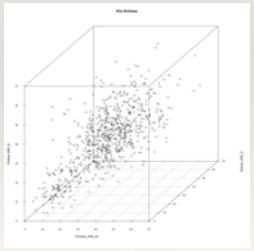
# Linear Patterning of the System through Lags

- Can we see structure in the aggregate population dynamics?
- CC lags compared to more weakly coupled/null systems

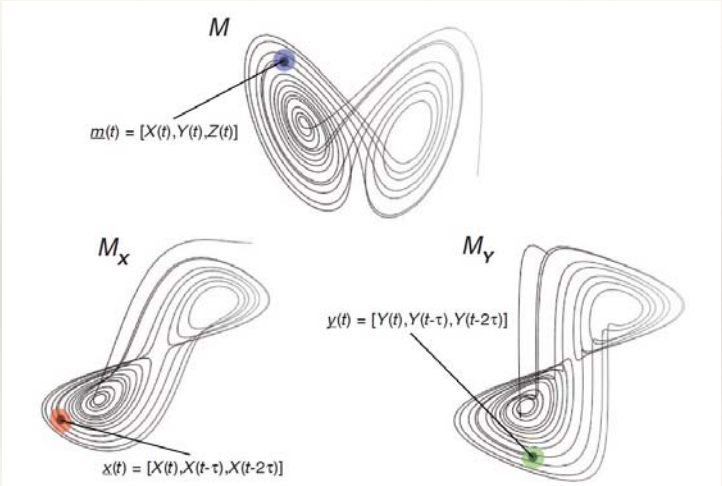








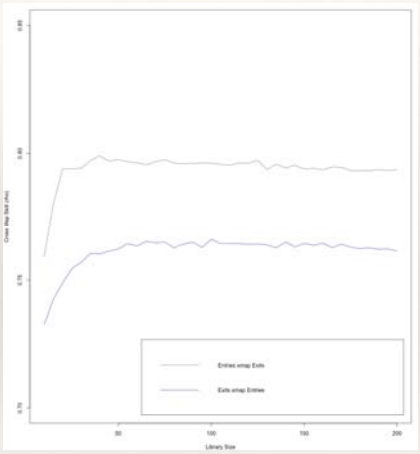
# Causality, Weak Coupling, Nonlinearity




Sugihara, et. al, 2012

# Convergent Cross Mapping: State-Level Congregate Care

- Entries cause exits: 0.7979
  (p < .001 )
- Exits cause entries: 0.7660
  (p < .001 )



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# CCM Results: Congregate Care (county-level detail)

| Care Type | CCM Coefficient Exits->Entries | CCM coefficient Entries->Exits | Lag (Entries) | ED (Entries) | Lag (Exits) | ED (Exits) |
|---|---|---|---|---|---|---|
| Congregate Care | 0.0901*** | | 11 | 1 | | |
| Congregate Care | 0.0748** | 0.0980*** | 12 | 6 | 8 | 7 |
| Congregate Care | 0.3987*** | 0.5022*** | 11 | 7 | 2 | 10 |
| Congregate Care | 0.3632*** | 0.3905*** | 7 | 7 | 9 | 8 |
| Congregate Care | 0.3638*** | 0.3555*** | 2 | 9 | 6 | 8 |
| Congregate Care | 0.4525*** | 0.5210*** | 3 | 10 | 4 | 10 |
| Congregate Care | 0.2073*** | 0.2231*** | 4 | 9 | 4 | 9 |

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# What does this structure tell us?

- Rate of response of a system to stimuli. *Resilience?*
- Existence of capacity constraints within system. *Resources?*
- *Potentially:* Difference between individual- and population-level dynamics. *Policy v. practice?*
- *Potentially:* Short-term forecasting. *Planning?*
- *Potentially:* Opportunities to back findings into parametric models. *Integration?*