Simulating Meth Production Networks

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19 FEB 14

Pearson/Singer Supported by ARO Award #W911NF-11-1-0036Z
Bright Supported by Colonial Foundation Trust

Overview

1. SNA Concerns Re Dark Networks

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2. A Meth Bust Network

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4. Next Steps

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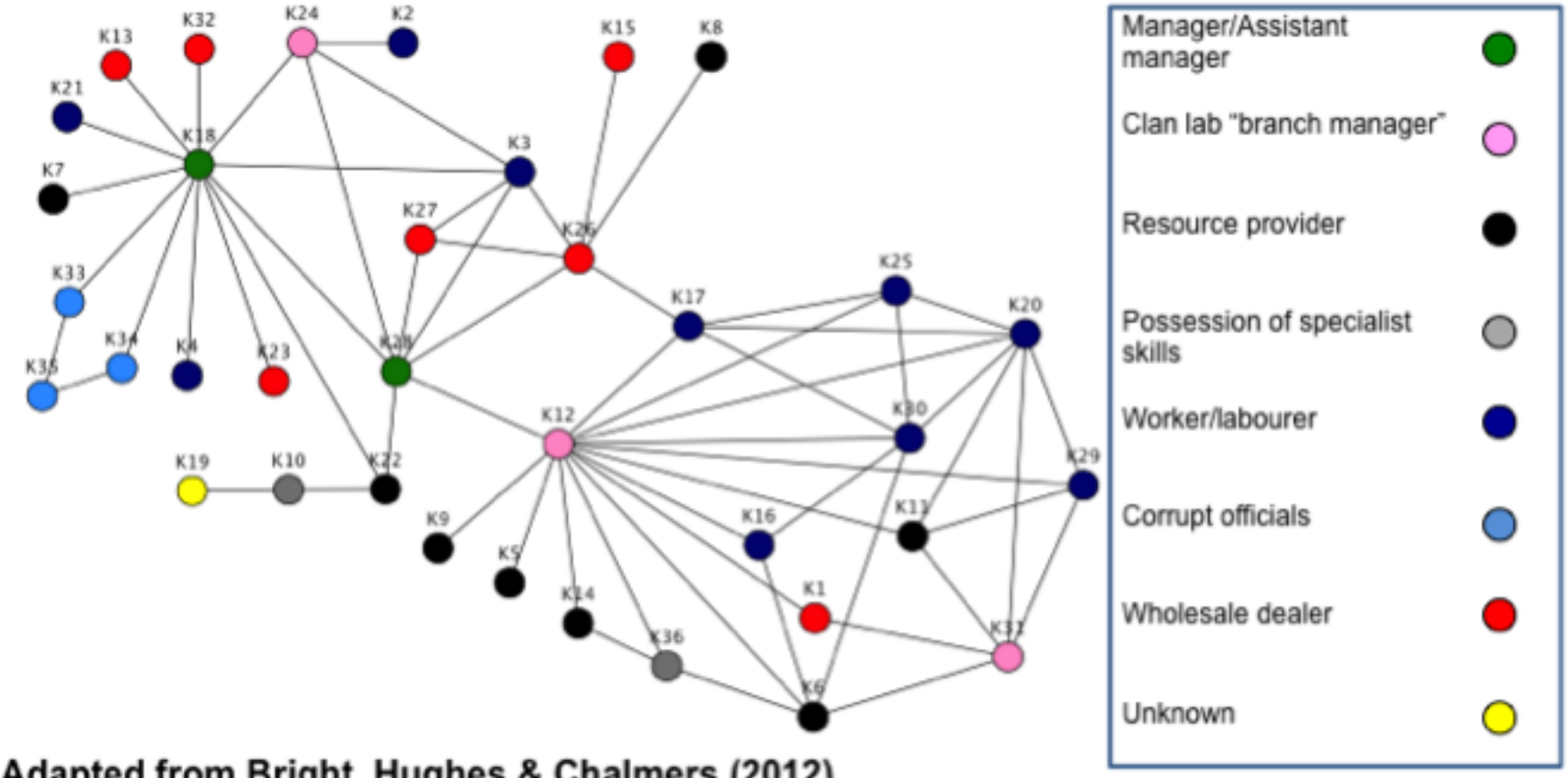
- For "dark" networks - highly questionable

PROSECUTED METH PRODUCTION & DISTRIBUTION GROUP



Adapted from Bright, Hughes & Chalmers (2012)

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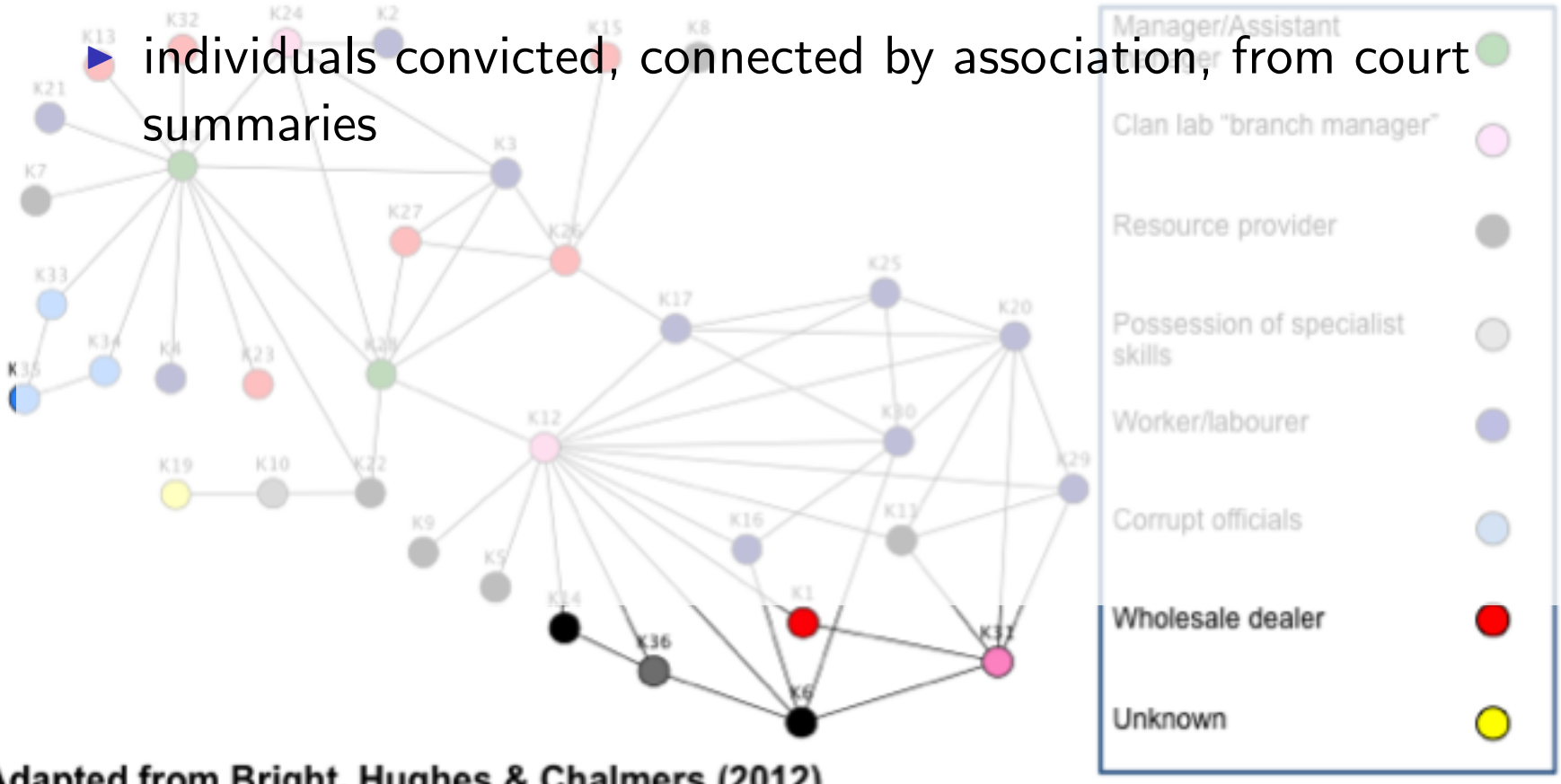

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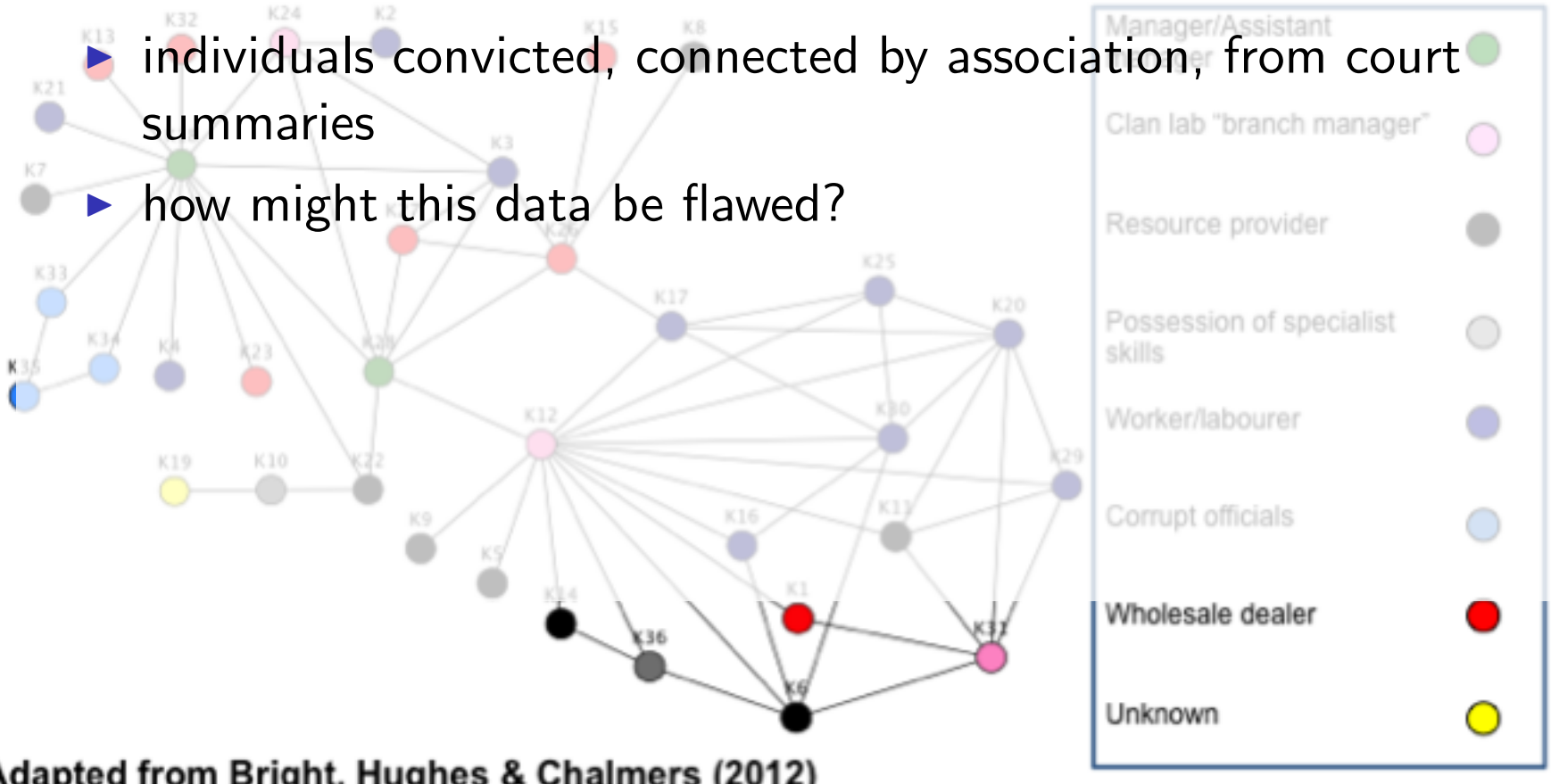

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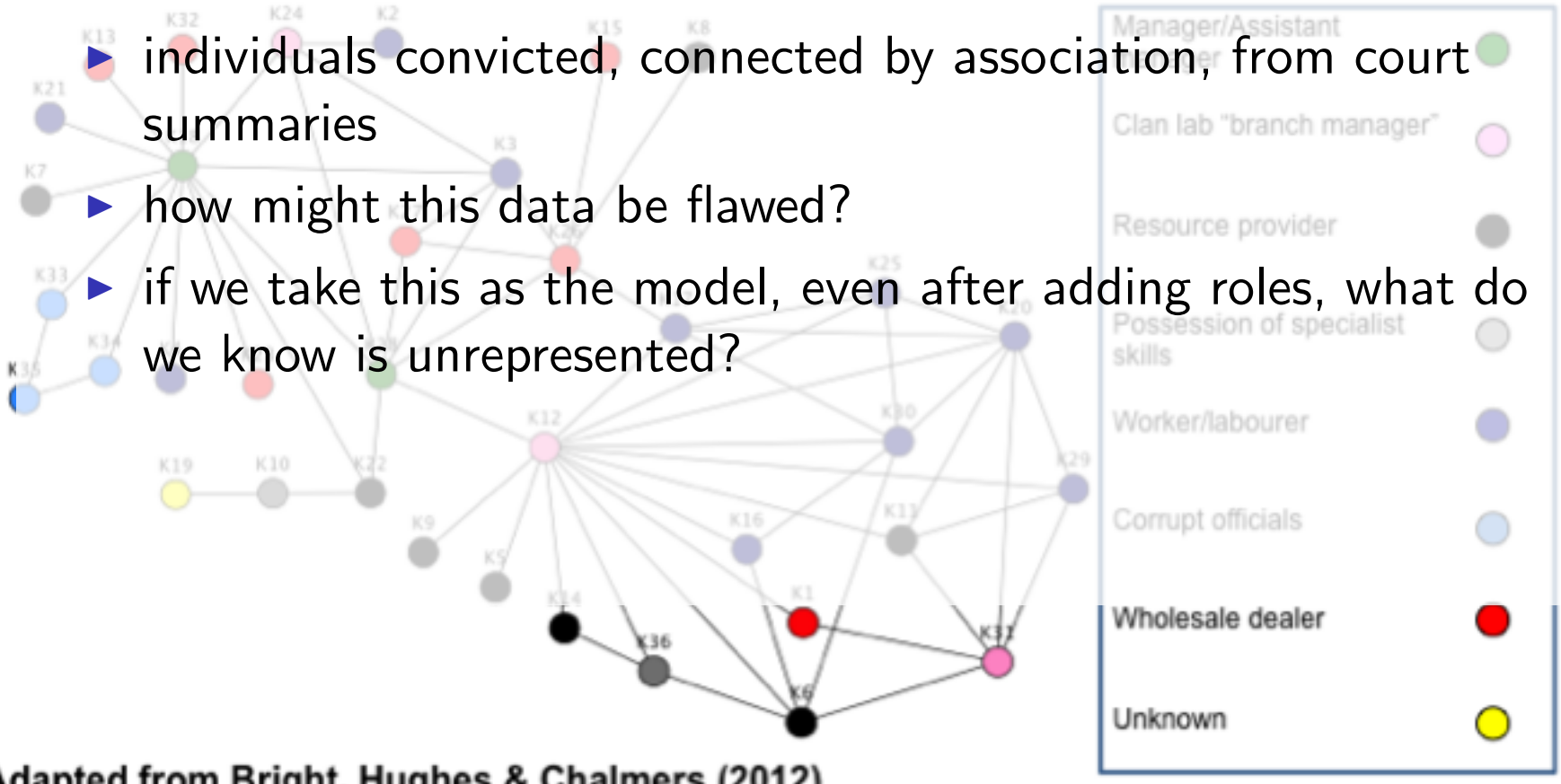

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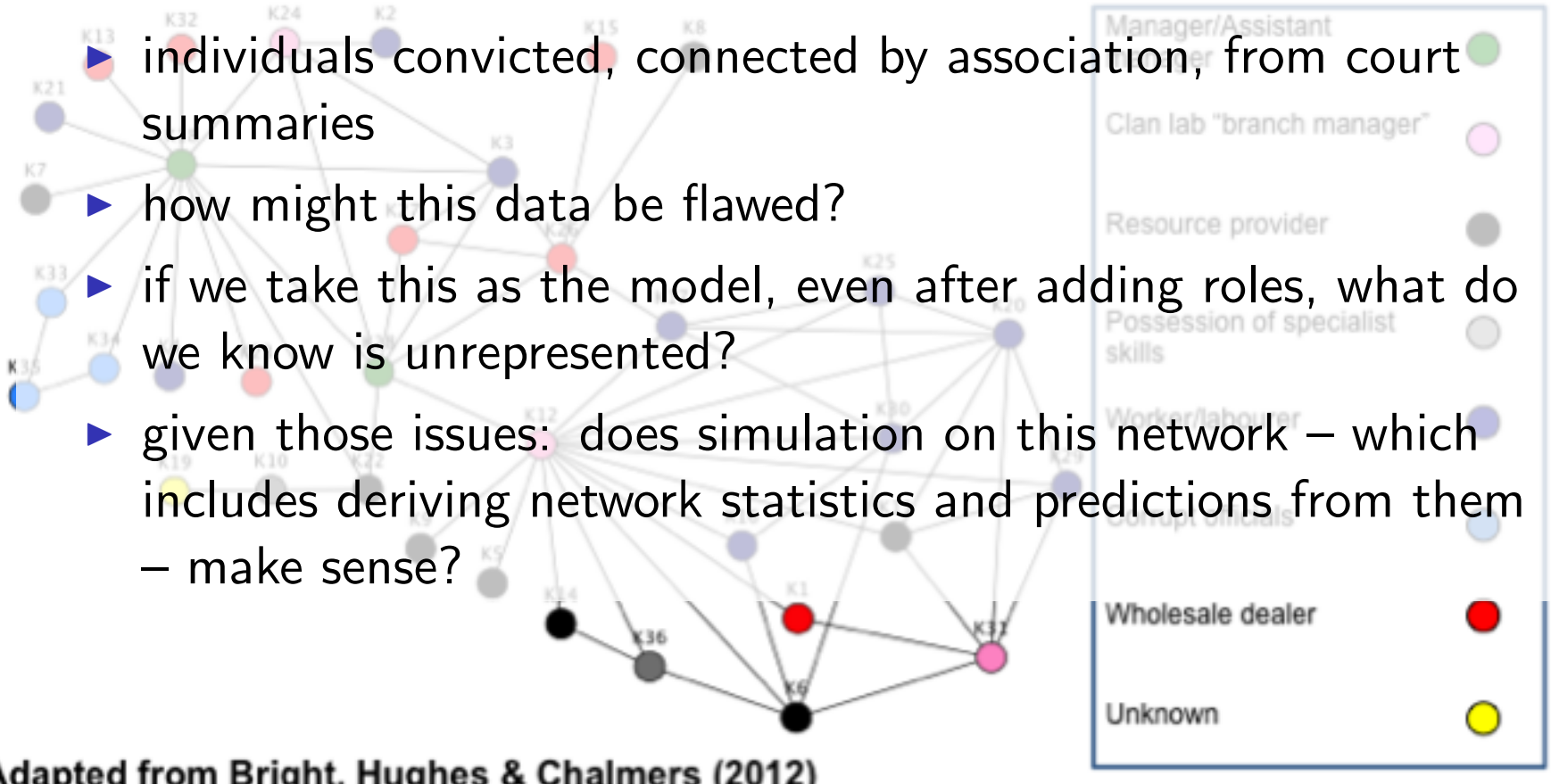
- if we take this as the model, even after adding roles, what do we know is unrepresented?
- given those issues: does simulation on this network – which includes deriving network statistics and predictions from them – make sense?



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- compare measures – pseudoephedrine consumption, methamphetamine production, net profit rates – to available estimates

SIMULATING METH PRODUCTION

Relatively few parts, all written in Scala

`World` target meth consumption rate, pseudo cost

`Supplier`, `Retailer`, `Wholesaler` margins and purchase or delivery efficiencies

`Middleman` margin, transaction efficiency

`Cook` margin, pseudo conversion efficiency

SIMPLE ECONOMIC FORCES ONLY

Agents try to net their margin per iteration. Demand for meth inelastic. No economies of scale. No competition in roles.

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PARAMETER ESTIMATES[2][3][4][1]

Use kgs, AUS $ and months as reference units

Meth produced per Pseudo 0.9

Meth Conversion Efficiency 0.5 - 1.0

Meth Consumption 0.02 mass per 1000 people per time

thing margins and purchase or delivery efficiencies

STEADY STATE RESULTS

Street Price X per dose vs observed Y per dose

Gang Takehome X per month vs observed Y per month

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PERTURBATIONS

TODO series of background plots

- Increase Pseudo Cost at time T
- Increase Demand at time T
- Increase Margins at time T
- Decrease efficiencies at time T

TODO

Next Steps

ion Model	translate simulate outputs via filter to observations
Dynamics	intra- and intergroup competition, turnover of employees, customers
Outcomes	single gang interventions, evolution of competing gangs

QUESTIONS?

talk and simulation source available at

https://github.com/pearsonca/sunbelt-2014

https://github.com/pearsonca/scala-commsim

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SUPPORTING MATERIAL

Meth Consumption

100 mg per dose; per capita: roughly 10 “regular” users (between weekly and monthly dose), roughly 10 “dependent” users

SUPPORTING MATERIAL

World Offers

historical bought / historical paid = expected price per unit

offer = sought drug quantity / expected price per unit

SUPPORTING MATERIAL

Retail Sale

historical bought / historical paid = average price per unit

target revenue per unit = average price per unit $(1 + \text{margin})$

provided units = offered / target revenue per unit

Retail Purchase

historical bought / historical paid = average price per unit

target revenue per unit = average price per unit $(1 + \text{margin})$

provided units = offered / target revenue per unit