UK LEADS Initiative:
Need-Based Financial Aid Strategies to Promote Student Success
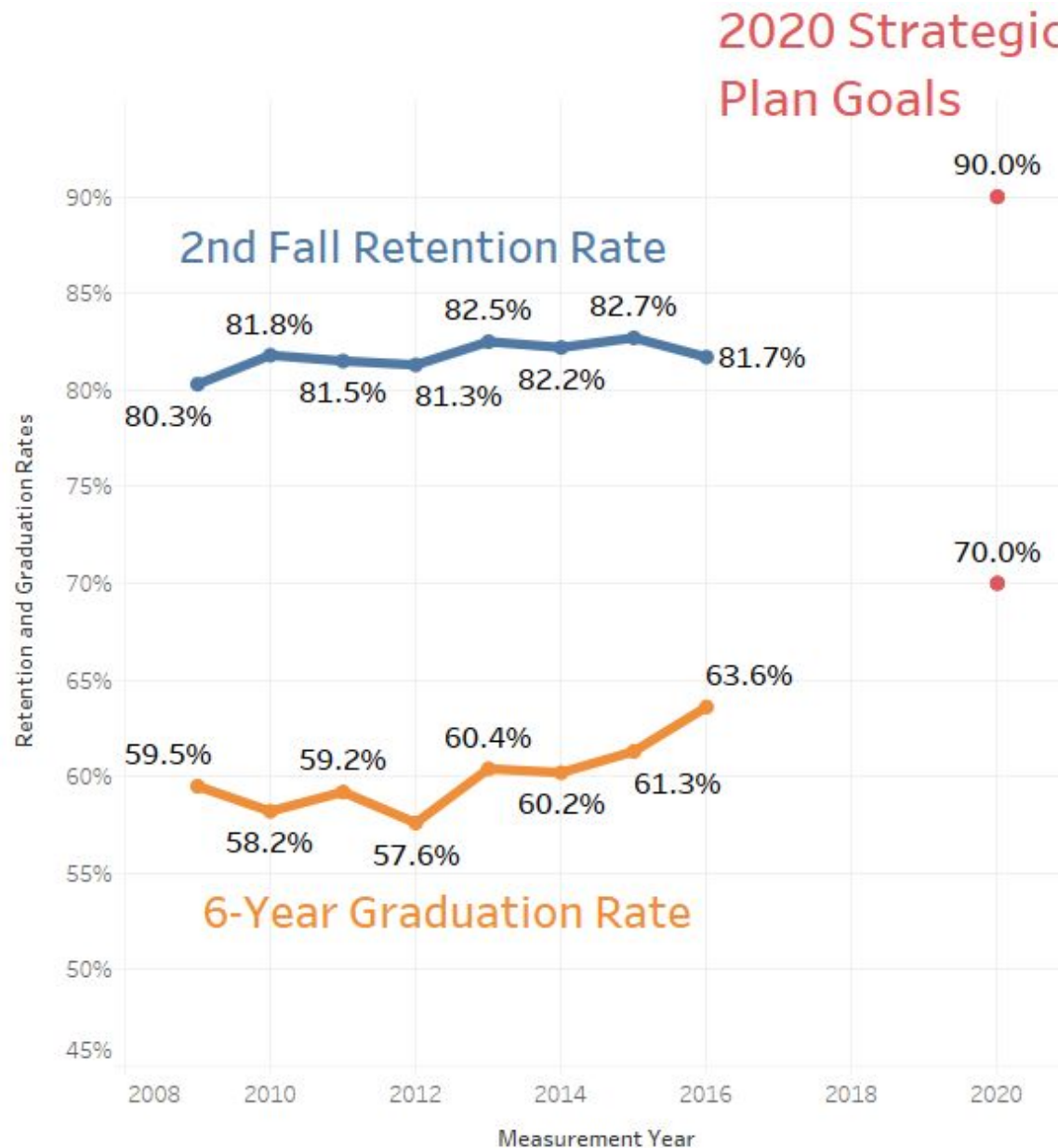
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KSSS 2017
Louisville, KY
4/4/2017

2020 Strategic Plan Goals

2nd Fall Retention Rate

6-Year Graduation Rate

UK has set **ambitious** retention and graduation goals.
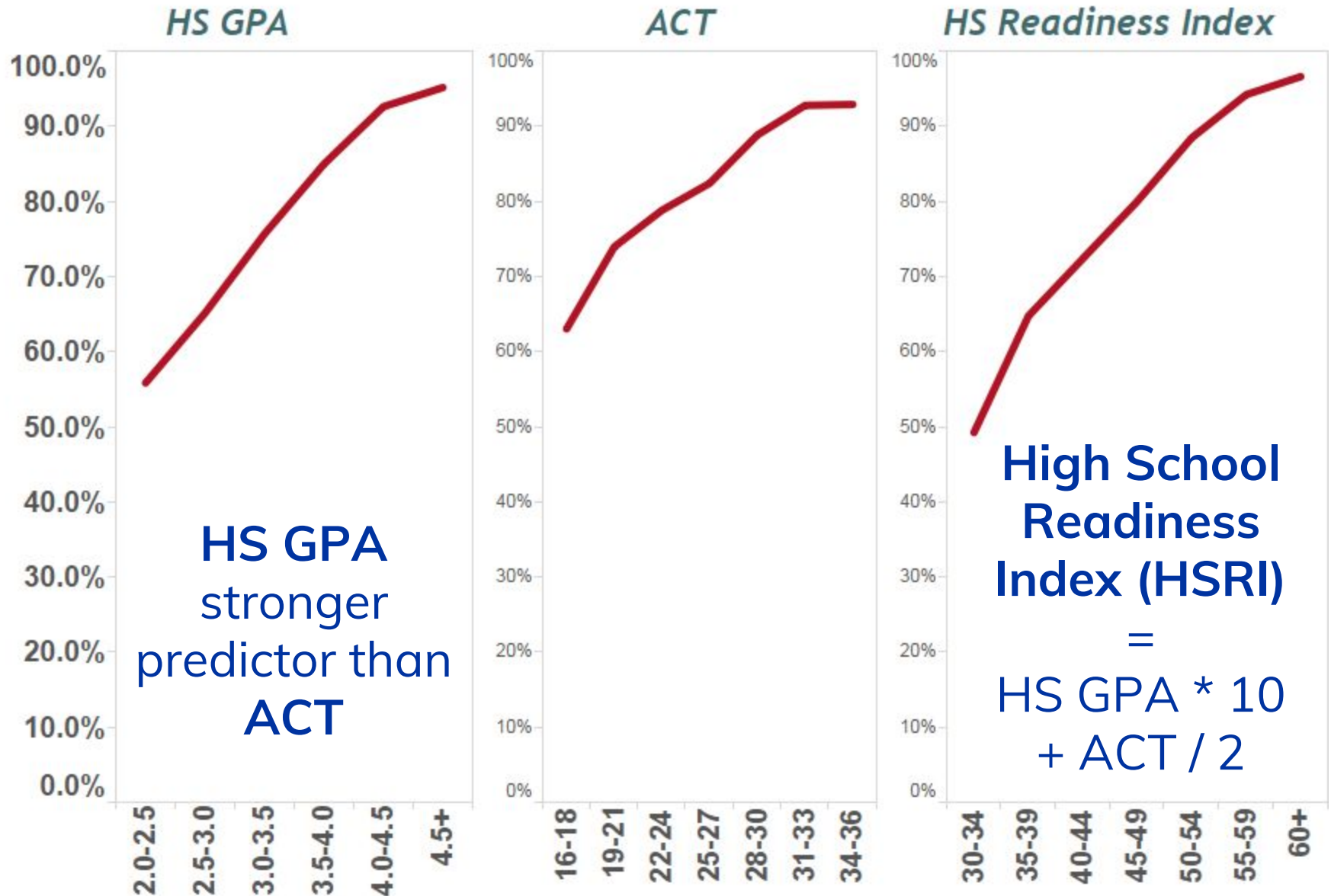
UK LEADS

Leveraging
Economic
Affordability for
Developing
Success

- Shifting resources toward need-based financial aid
- Prioritizing the four pillars of student success:
  - academic success
  - financial stability
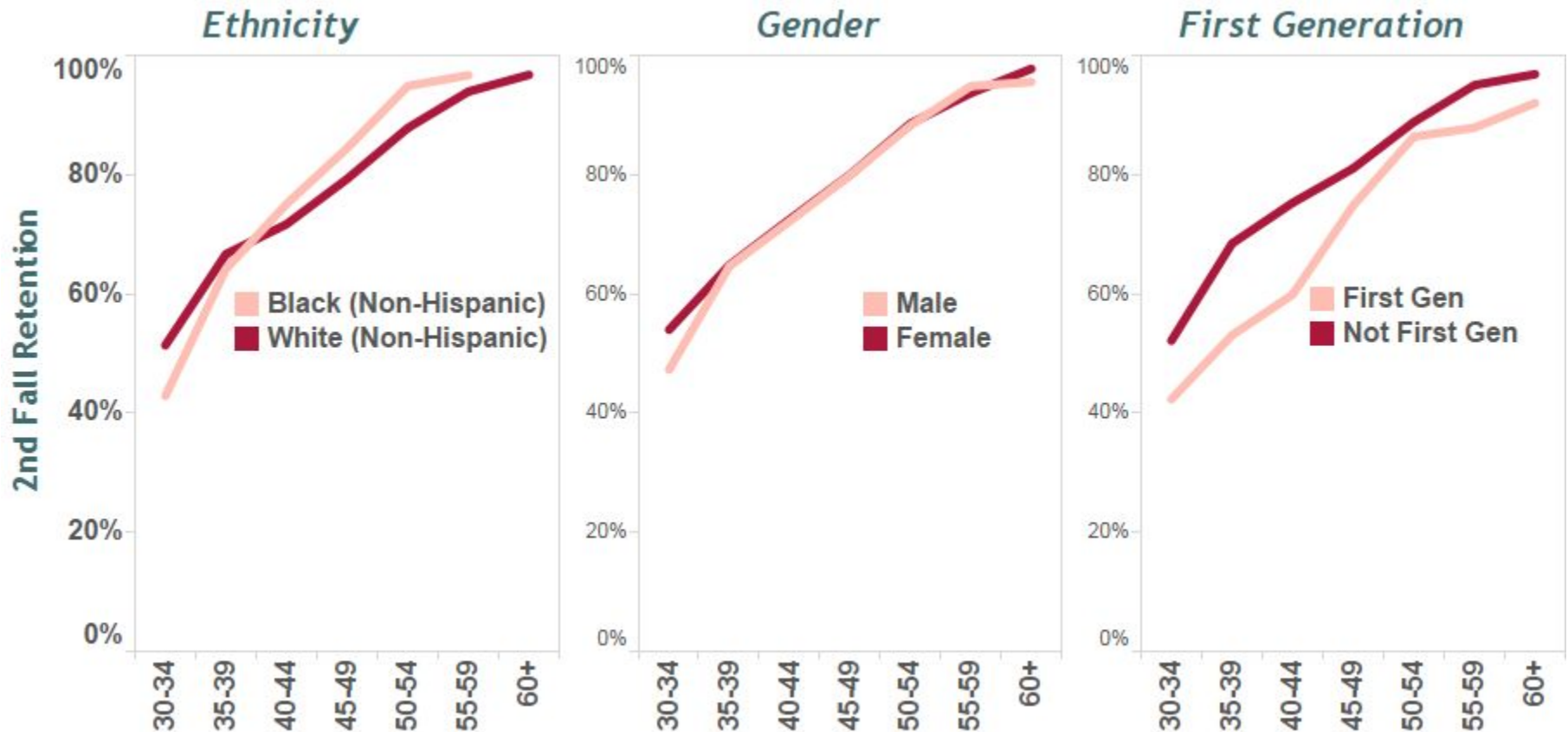 - belonging and engagement
  - wellness

Presentation Outline

1. Data analysis (Craig)

2. Implementation strategies (Todd)

Retention vs. Readiness Variables

HS GPA

HS GPA stronger predictor than **ACT**

ACT

HS Readiness Index

High School Readiness Index (HSRI)
=
HS GPA * 10 + ACT / 2

Demographic factors, such as first generation status, have a **small effect** on retention

FAFSA Financial Variables

- **Adjusted Gross Income (AGI):**
  - family income, adjusted for deductions.

- **Expected Family Contribution (EFC):**
  - Government estimate of what a student's family can pay for college.

- **Gross Need:**
  - Cost of Attendance minus Expected Family Contribution

- **Unmet Need:**
  - Gross Need minus total aid package
  - Aid package includes subsidized loans

~80%

FAFSA Completion (GRS Cohort)
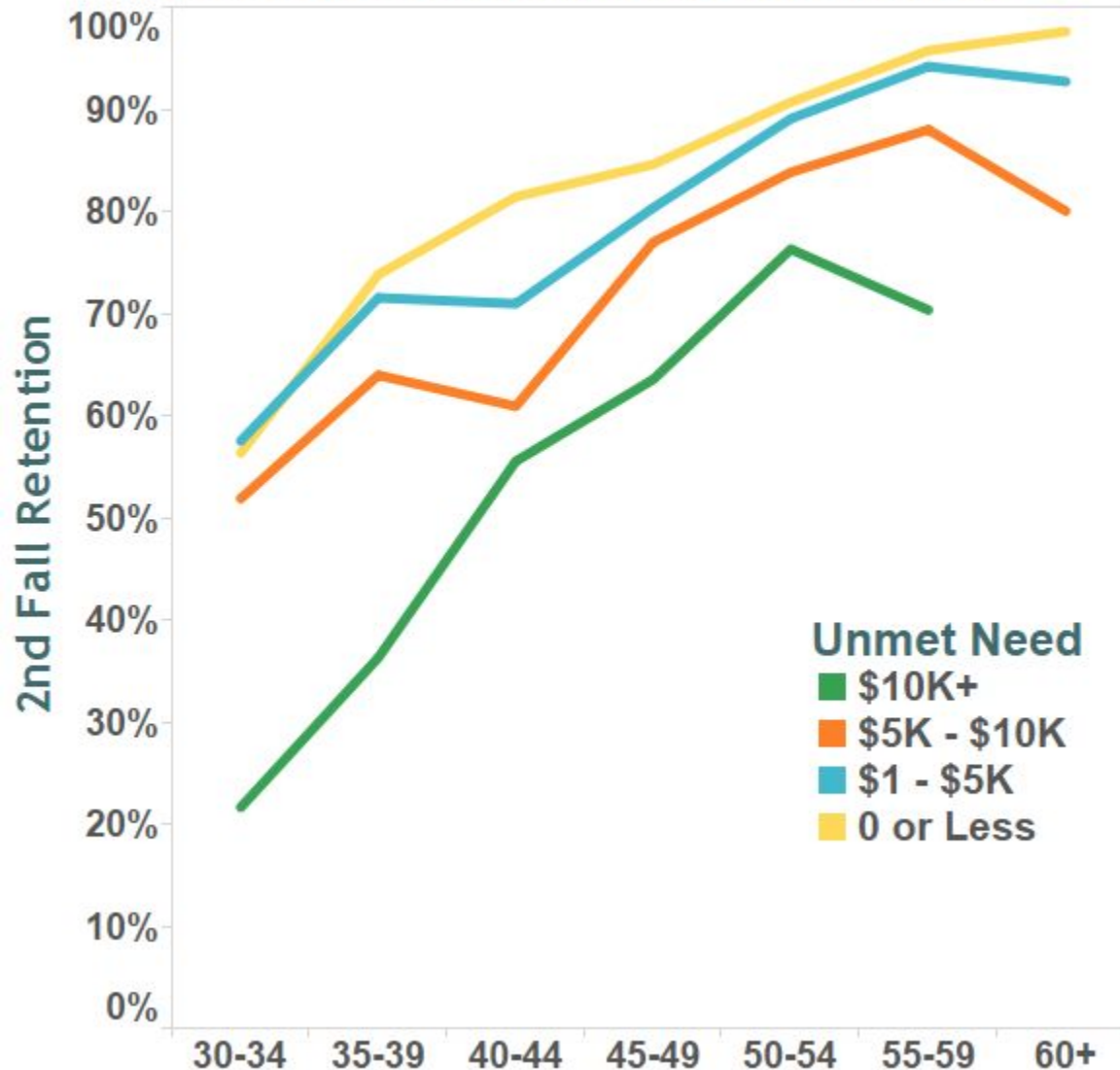
Retention vs. Financial Variables
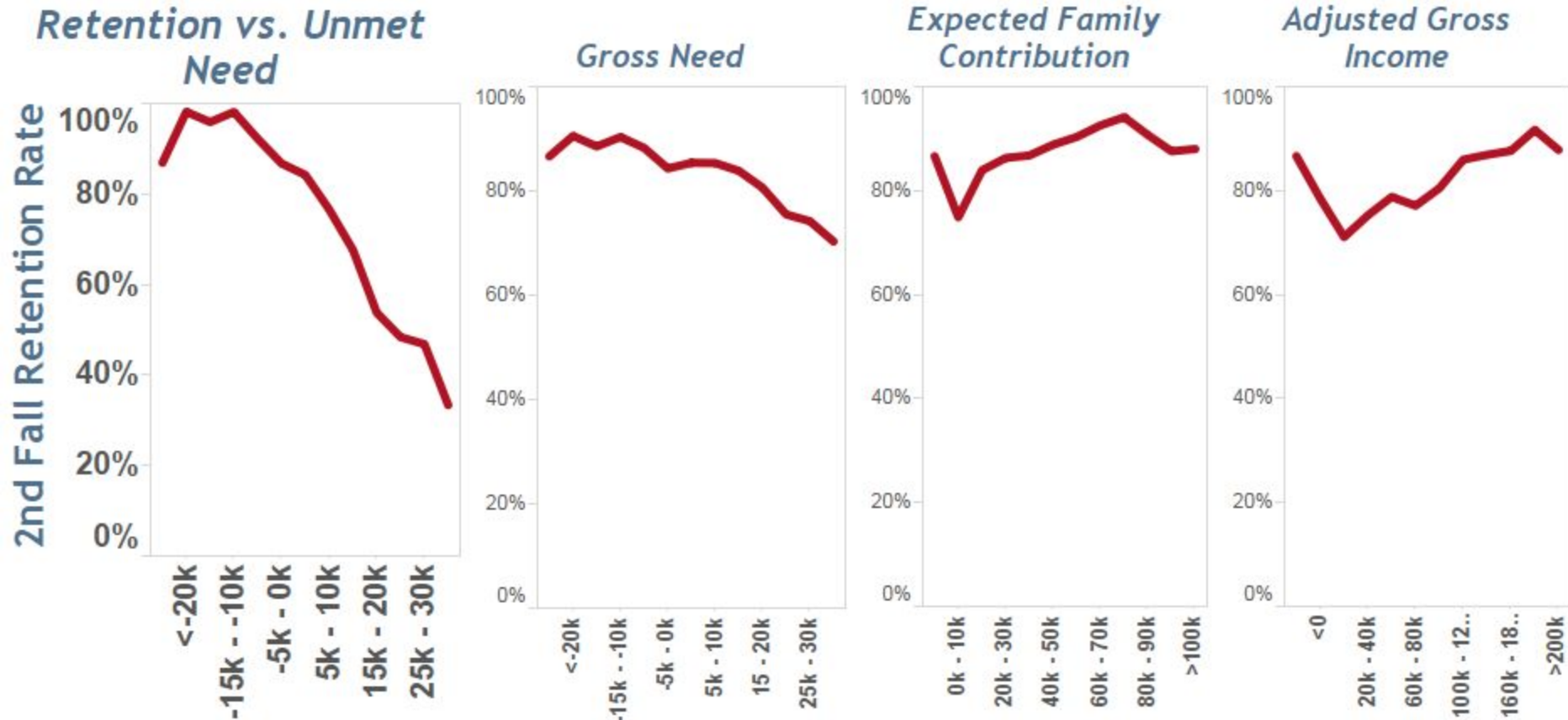
Unmet Need!

Retention v. Unmet Need split by Residency

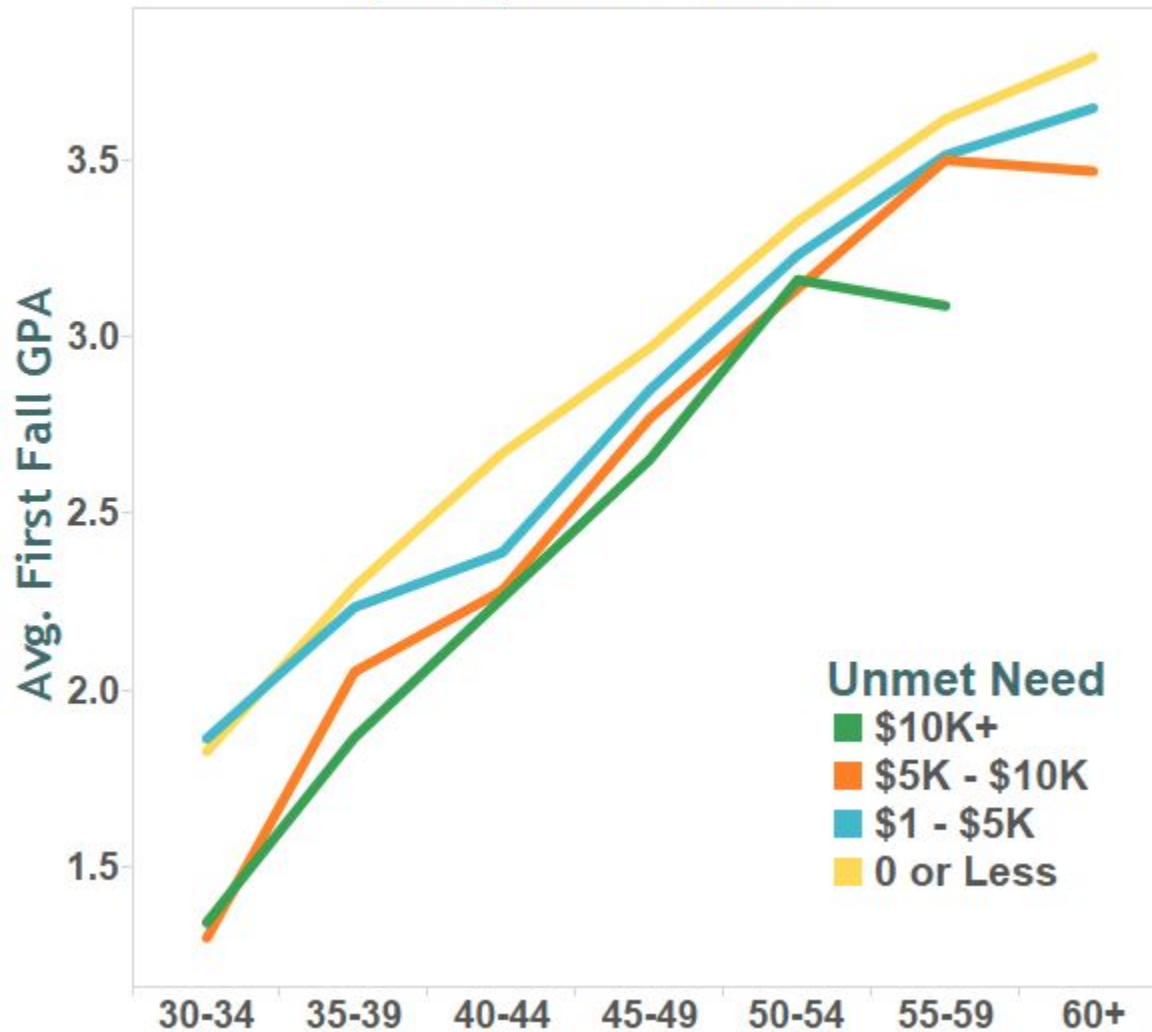**In-State** students feel greater impact of Unmet Need than **Out-Of-State.**

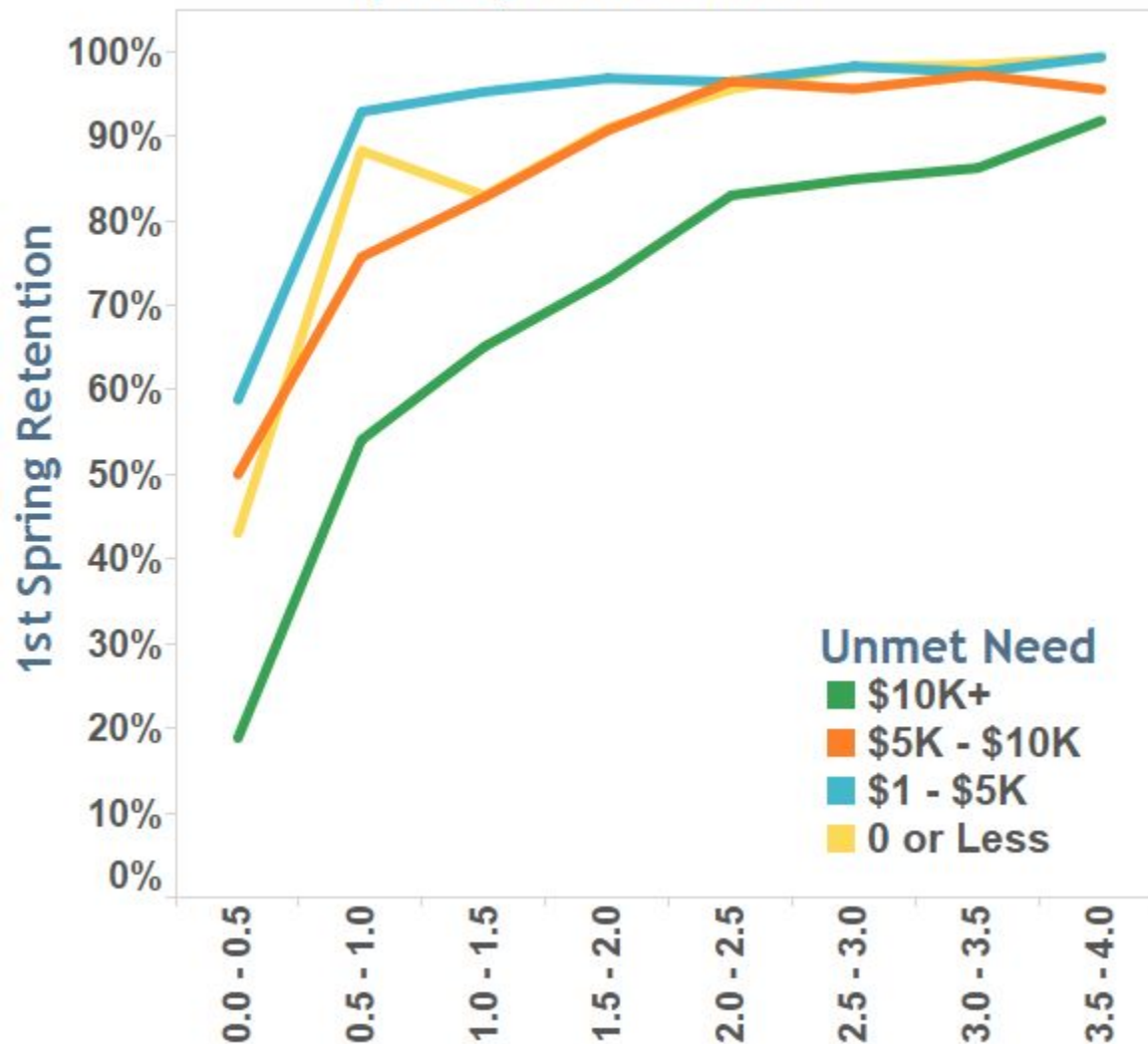Retention vs. HSRI split by Unmet Need

High Unmet Need lowers retention rates.

Applies at all levels of readiness.

First Fall GPA vs. HSRI split by Unmet Need

High Unmet Need affects academic performance

Unmet Need has a particularly strong effect on 1st Spring retention.

Retention vs. 1st Fall GPA split by Unmet Need
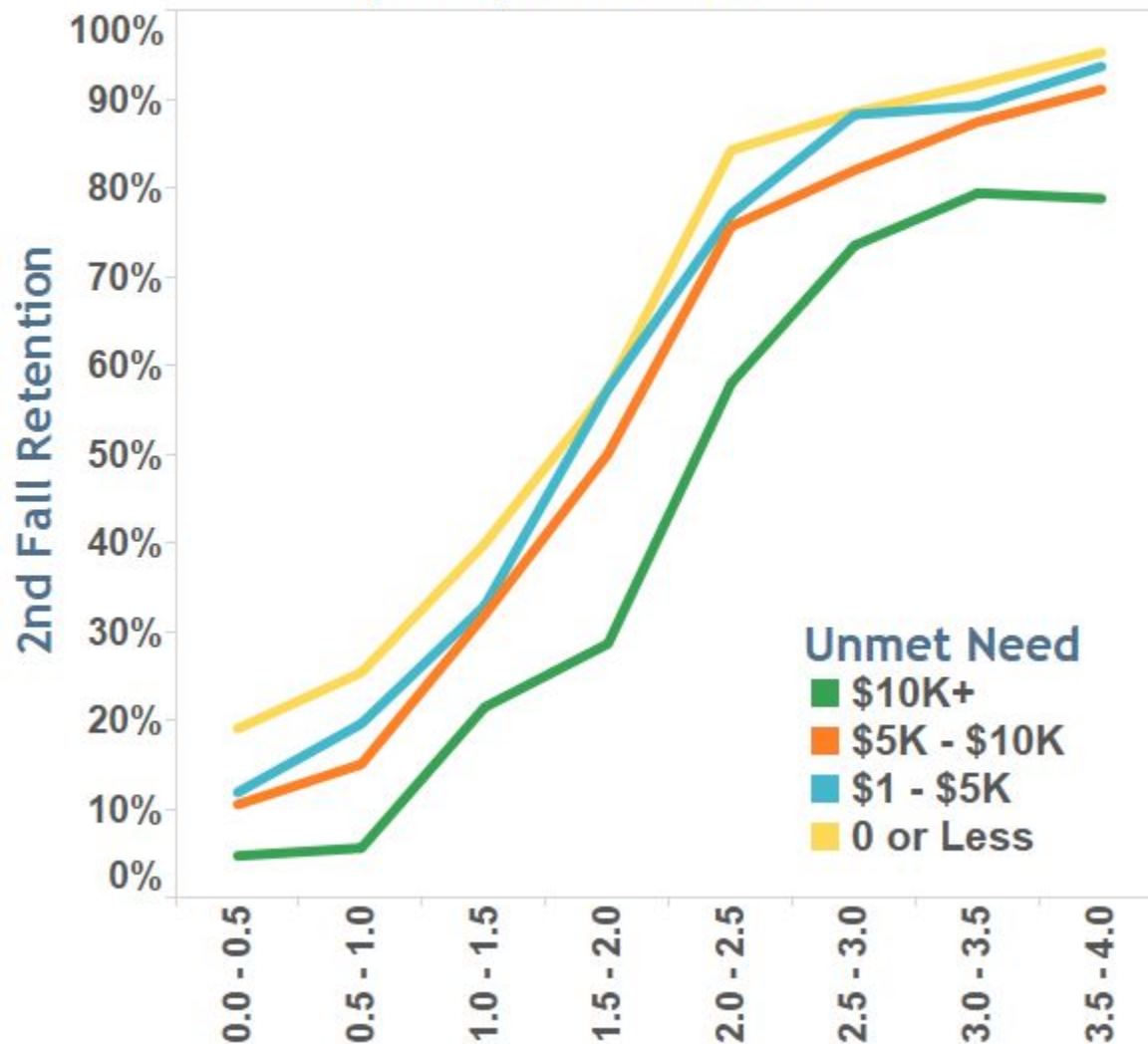
Academic performance has a stronger influence on **2nd Fall retention**.

3rd Fall to 4th Fall Retention vs. HSRI split by Unmet Need
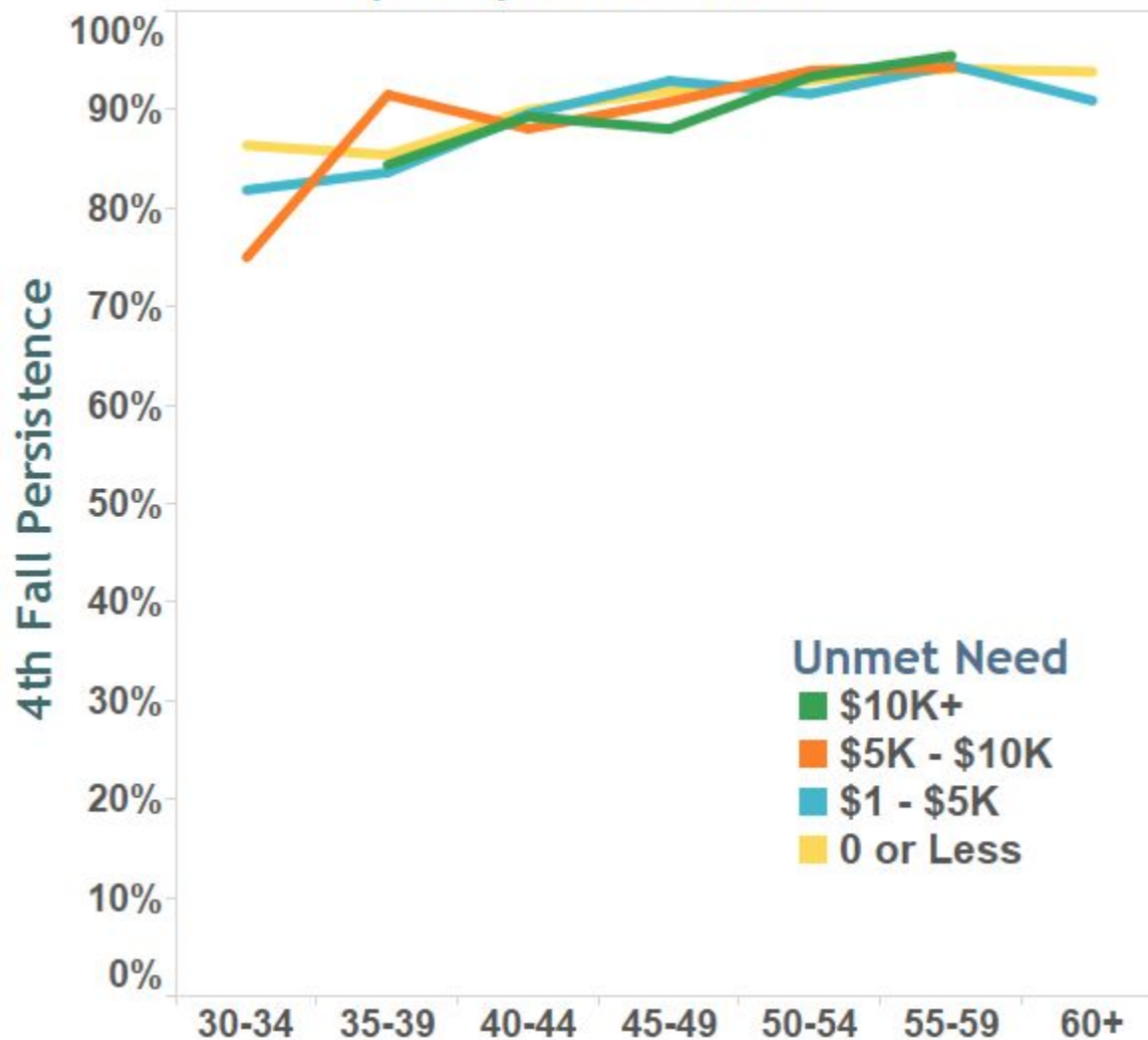
Survivor Effect: Unmet Need is less important for upper-division retention or graduation.

Students with at least $10K in Unmet Need
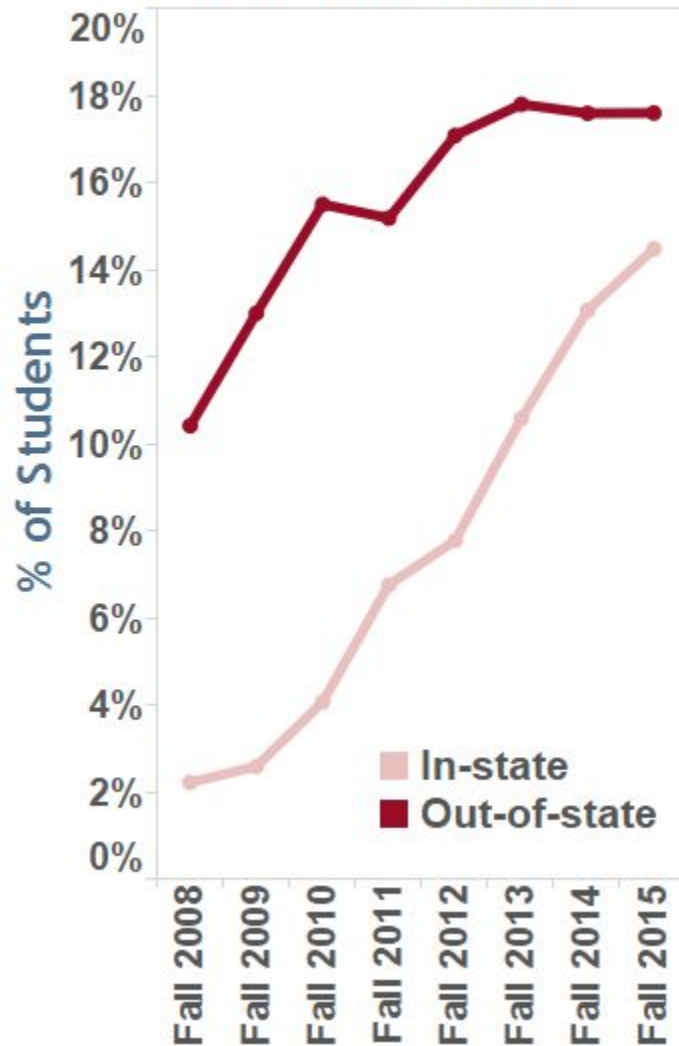
Distribution of Unmet Need
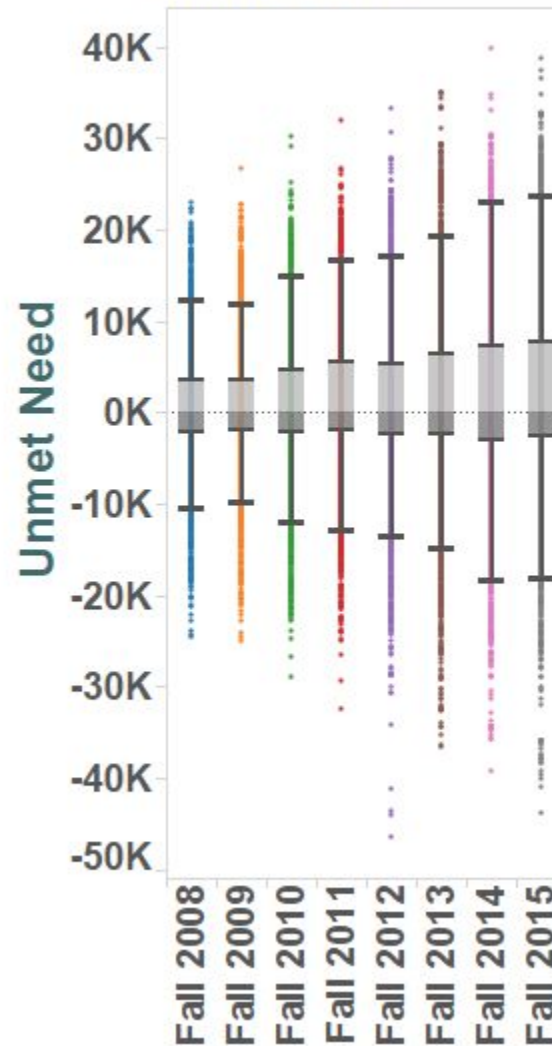
Unmet Need is growing rapidly!

Distribution of unmet need is widening (more at high and low).

- **Increasing Unmet Need burden** is likely leading to **lower retention rates.**

- Build **predictive models** to quantify the effects of unmet need and other variables.
  - Logistic regression
  - Random forests

- Create **"what-if" models** to measure the retention rate given changes to the Unmet Need distribution
  - Assumes that Unmet Need is causal
  - Possible that Unmet Need co-varies with other hidden variables which are true drivers of attrition

Simulate retention of Fall 2013 class, if Unmet Need matched Fall 2008.

- Use rank-matching to assign a "Simulated Unmet Need" to each Fall 2013 cohort student
- Use L.R. to calculate new "simulated" retention probability for each student.
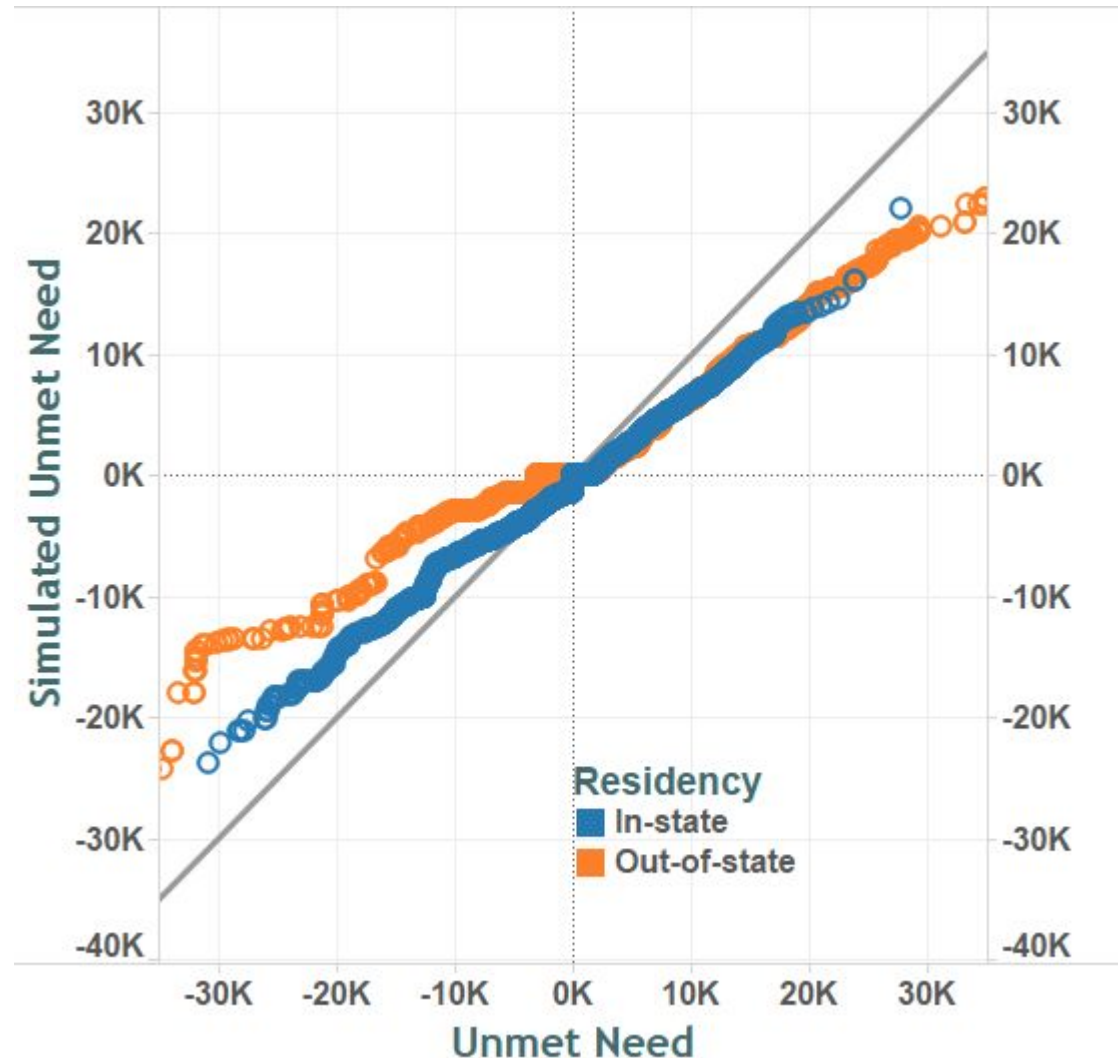
- Students with high Unmet Need have a lower "simulated" Unmet Need, their retention probability increases.

- Net effect: **1.6% point increase in the retention rate**.
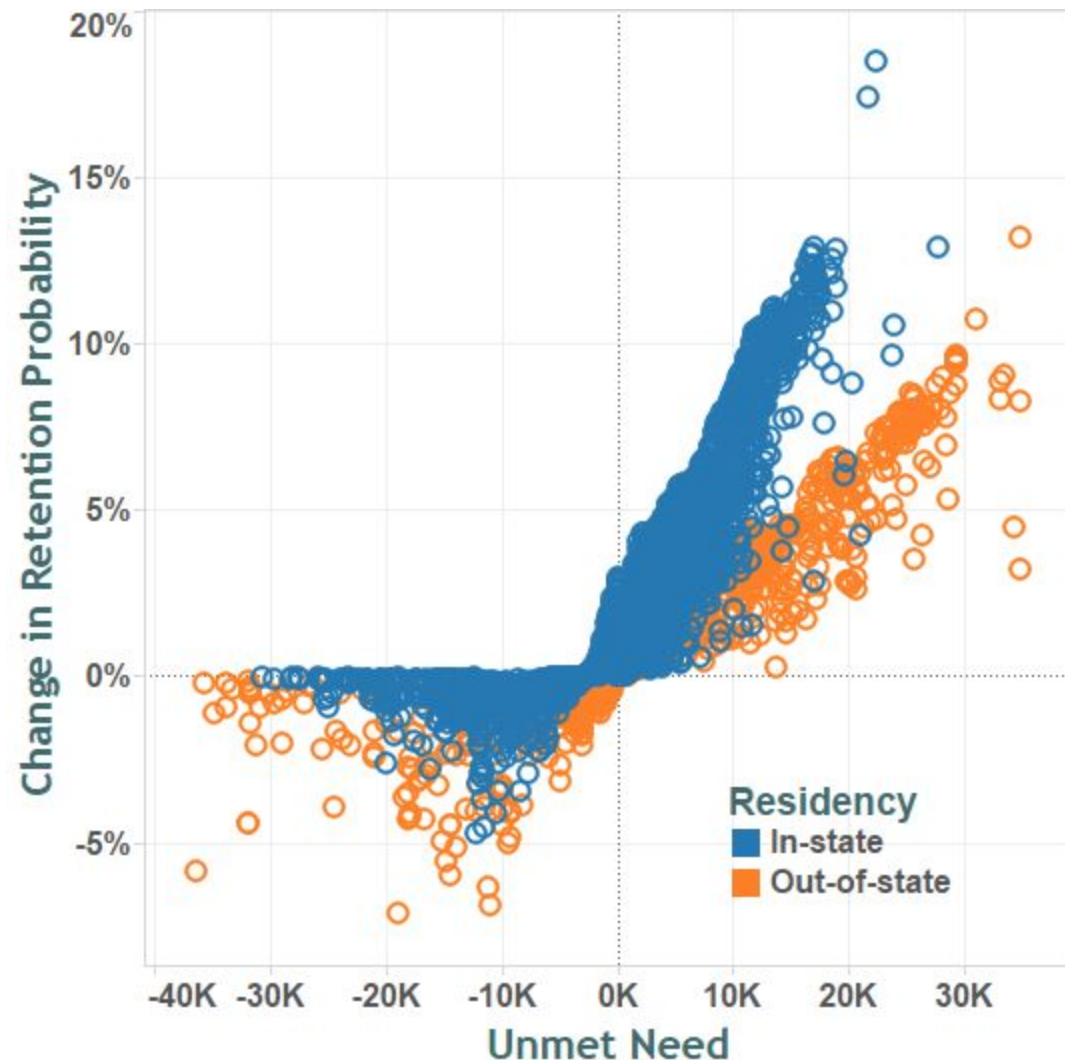
- If Unmet Need is driving attrition, then **need-based aid** could amend this.
  - How much money does retention cost?

- Simplest solution is **eliminate Unmet Need**
  - Set all students with positive Unmet Need to 0, and re-calculate predicted retention

Cohort Term	Actual Retention Rate	Predicted Change in Retention Rate	Cost of Eliminated Unmet Need
Fall 2009	81.8%	2.4%	$7,270,762
Fall 2010	81.5%	2.9%	$9,569,360
Fall 2011	81.3%	3.4%	$10,521,664
Fall 2012	82.5%	3.5%	$12,619,187
Fall 2013	82.2%	4.3%	$14,858,680

- Doesn't account for additional tuition revenue from retained students!

Analysis Conclusions

1. Unmet Need is a strong driver of retention.
   a. At least as predictive as pre-college academic readiness.
   b. Particularly important for 1st semester attrition.
2. The number of students with high Unmet Need burdens is growing rapidly.
3. Shifting resources to need-based financial aid may be necessary to improve retention.

Implementation Strategies

Fall 2013 to 2015 Cohorts

- Utilizing pre-enrollment information, in order to replicate available information for a Freshman awarding strategy, we modeled the Fall 2013 to 2015 Cohorts and scored the Fall 2016 Cohort

- We used Fall 2013 to 2015 Cohorts to train and test each other and all three to score the Fall 2016 Cohort

- Only FAFSA filers and students scored with a predicted probability were included - ≈ 78% of Fall 2013 to 2016 Freshmen

- Fall 2016 Unmet Need as of Sept. 26

- A few additional variables were included in the model but did not fundamentally change pseudo-R^2 or AUC values

  College
  Student Account Balance as of Sept. 23
  First Income Quartile – Yes
  Financial Hold on Sept. 23 – Yes
  Late Deposit (Confirmed May or Later)

Fall 2013 to 2015 Cohorts

Fall 2013 to 2015 Retention
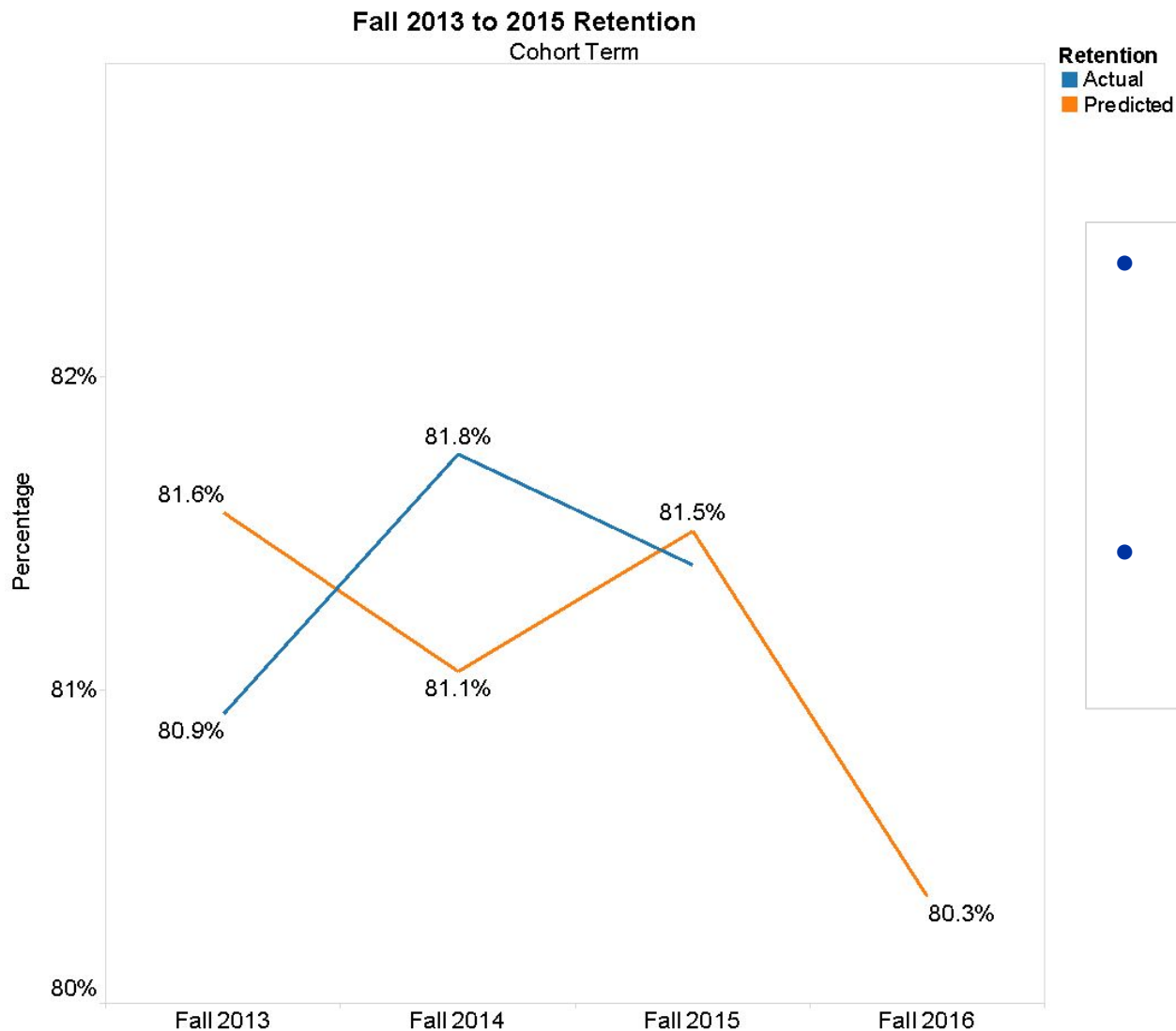
- Looking at each Cohort separately, actual retention was lower than predicted for Fall 2013, higher than predicted for Fall 2014 and very similar for Fall 2015

- A decrease of 1.2% in predicted retention is expected for Fall 2016

Fall 2013 to 2015 Cohorts

Freshman Cohort Predicted vs. Actual Retention
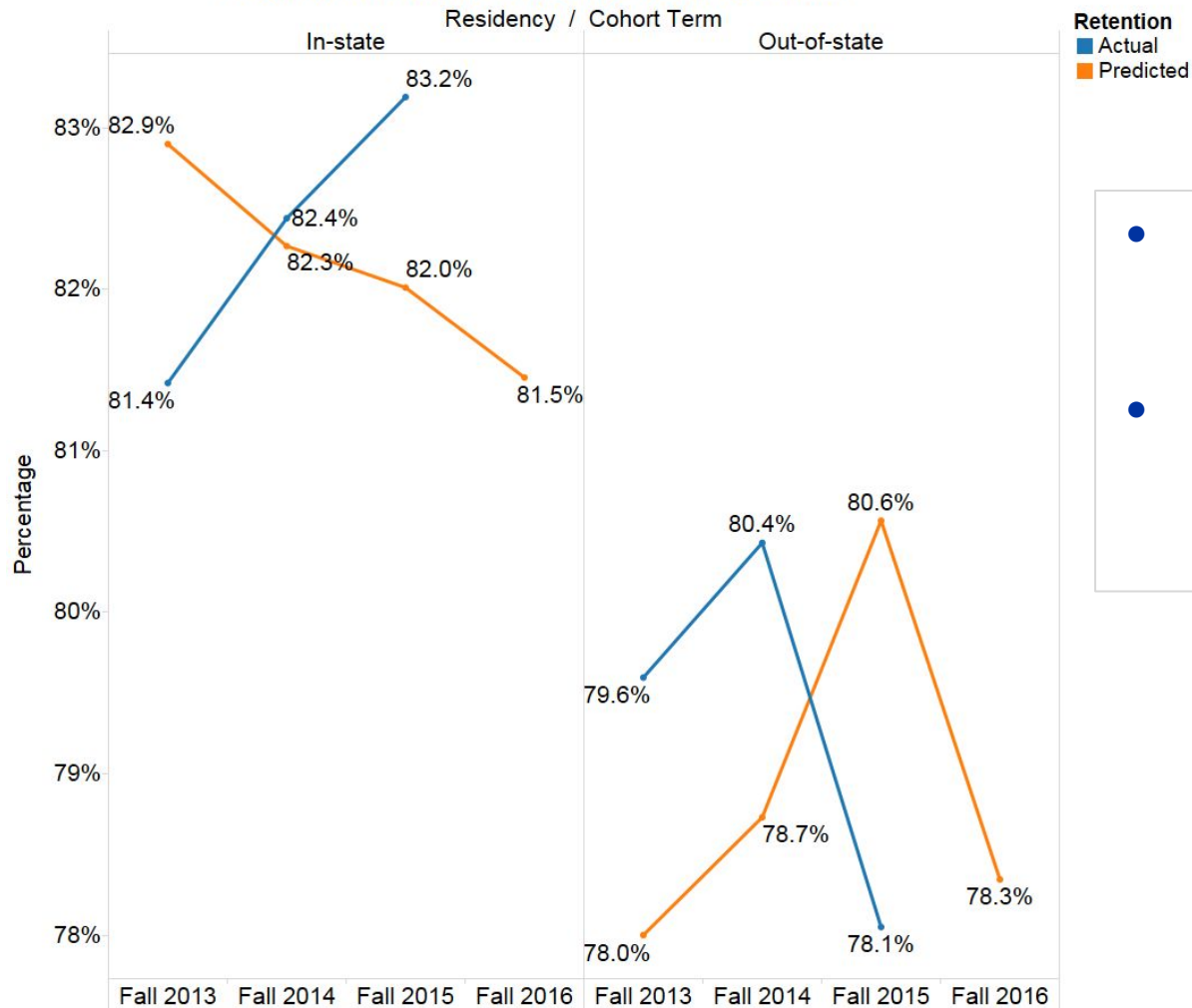
- Lower than predicted retention for Fall 2013 driven by In-state students

- Fall 2014 Out-of-state students retained higher than predicted, possibly due to change in institutional aid strategy

Financial Target Subcohort Options

In an effort to identify potential target populations, we looked at the historical Retention rate for various groups of students with negative financial and demographic indicators.

- **Option 1**
  - HSRI 36 to 46 and
  - Unmet Need of $5K or more

- **Option 2**
  - HSRI 36 to 50 and
  - Unmet Need of $5K or more

- **Option 3**
  - Unmet Need of $5K or more and
  - First Income Quartile

- **Option 4**
  - Unmet Need of $5K or more and
  - First Income Quartile and
  - Financial Hold on Sept. 23

Option 1	Fall 2013	Fall 2014	Fall 2015	Average
Not Retained	205	206	206	206
Retained	264	319	278	287
Total	469	525	484	493
Retention %	56.3%	60.8%	57.4%	58.3%

Option 2	Fall 2013	Fall 2014	Fall 2015	Average
Not Retained	297	289	306	297
Retained	440	529	500	490
Total	737	818	806	787
Retention %	59.7%	64.7%	62.0%	62.2%

Option 3	Fall 2013	Fall 2014	Fall 2015	Average
Not Retained	187	207	205	200
Retained	246	367	397	337
Total	433	574	602	536
Retention %	56.8%	63.9%	65.9%	62.8%

Option 4	Fall 2013	Fall 2014	Fall 2015	Average
Not Retained	100	136	139	125
Retained	139	206	197	181
Total	239	342	336	306
Retention %	58.2%	60.2%	58.6%	59.1%

Financial Target Subcohort Options

The goal was to identify students cohorts with historically low 2nd Fall retention rates, due to financial reasons. While all students with these levels of Unmet Need would benefit from a need-based award, we tried to prioritize students who may not return without additional aid.

- **Option 5**
  - Unmet Need of $5K or more and
  - First Income Quartile and
  - Financial Hold on Sept. 23 and
  - Account Balance of $5K or more on Sept. 23

- **Option 6**
  - Unmet Need of $5K or more and
  - Financial Hold on Sept. 23 and
  - Account Balance of $5K or more on Sept. 23

- **Option 7**
  - Unmet Need between $15K and $25K and
  - First Generation or
  - Confirmed Orientation May or later or
  - Living Off Campus

- **Option 8**
  - Unmet Need between $15K and $25K

Option 5	Fall 2013	Fall 2014	Fall 2015	Average
Not Retained	52	79	80	70
Retained	52	93	62	69
Total	104	172	142	139
Retention %	50.0%	54.1%	43.7%	49.5%

Option 6	Fall 2013	Fall 2014	Fall 2015	Average
Not Retained	112	156	134	134
Retained	147	228	148	174
Total	259	384	282	308
Retention %	56.8%	59.4%	52.5%	56.5%

Option 7	Fall 2013	Fall 2014	Fall 2015	Average
Not Retained	54	61	82	66
Retained	38	55	54	49
Total	92	116	136	115
Retention %	41.3%	47.4%	39.7%	42.7%

Option 8	Fall 2013	Fall 2014	Fall 2015	Average
Not Retained	91	135	155	127
Retained	99	147	172	139
Total	190	282	327	266
Retention %	52.1%	52.1%	52.6%	52.3%

Actual vs. Predicted Retention

For Options 5 through 8, we compared the Actual and Predicted 2nd Fall Retention rates in 2015

- **Overall**
  - Actual 2nd Fall Retention (3,973 students) – 81.4%
  - Predicted 2nd Fall Retention (3,973 students) – 81.5%

- **Option 5**
  - Actual 2nd Fall Retention (142 students) – 43.7%
  - Predicted 2nd Fall Retention (141 students) – 51.8%

- **Option 6**
  - Actual 2nd Fall Retention (282 students) – 52.5%
  - Predicted 2nd Fall Retention (279 students) – 55.6%

- **Option 7**
  - Actual 2nd Fall Retention (136 students) – 39.7%
  - Predicted 2nd Fall Retention (132 students) – 46.1%

- **Option 8**
  - Actual 2nd Fall Retention (327 students) – 52.6%
  - Predicted 2nd Fall Retention (321 students) – 56.5%

- **Option 5**
  - Unmet Need of $5K or more and
  - First Income Quartile and
  - Financial Hold on Sept. 23 and
  - Account Balance of $5K or more on Sept. 23

- **Option 6**
  - Unmet Need of $5K or more and
  - Financial Hold on Sept. 23 and
  - Account Balance of $5K or more on Sept. 23

- **Option 7**
  - Unmet Need between $15K and $25K and
  - First Generation or
  - Confirmed Orientation May or later or
  - Living Off Campus

- **Option 8**
  - Unmet Need between $15K and $25K

Summing the predicted probabilities works very well for the total class (Overall) and seems to work better for larger numbers of students (Options 6 and 8).

Option Evaluations

For each Subcohort student, Unmet Need was reduced by ½ and we evaluated the below metrics:

- Predicted Subcohort 2nd Fall Retention increase
- Number of additional students predicted to retain
- Initial Grant Expense
- Projected Additional Tuition and Mandatory Fee Revenue
- Net Expense
- Net Expense per additional student retained

Assumptions

- All Subcohort students would be retained in the 1st Spring but not to the 2nd Fall (no new revenue in the 1st year)
- Additional Gross Revenue based on full year Lower Division Tuition and Mandatory Fees with projected increases
- Net Expense = Grant Expense (in the 1st year) – Projected Additional Gross Revenue (in the 2nd year)

Financial Target Subcohort Options

Fall 2013 to 2015 Retention — Unmet Need Bin

Cohort Term: Fall 2013, Fall 2014, Fall 2015
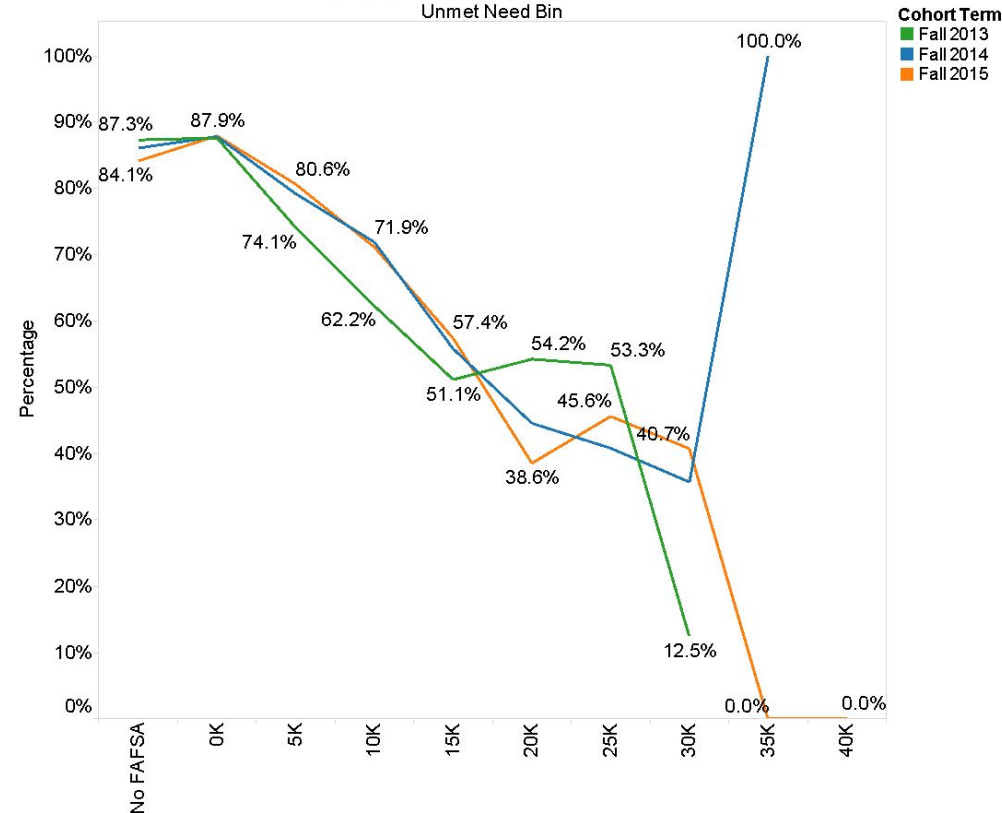
- Finally, we examined the utilization of students who we know are at risk of not being retained due to Unmet Need from our descriptive analysis (Unmet Need between $5,000 and $25,000). For these students, we applied aid using three different awarding strategies (detailed at the bottom). The increase in retention was calculated using the sum of predicted probabilities. The third hybrid approach was slightly more efficient, so we proceeded with this strategy.

- **Option 9**
  - Unmet Need between $5K and $25K
  - Students selected based on largest increase in predicted retention

Fall 2016 Cohort	Retention % ↑	Expense	Expense Ratio
Reduced Unmet Need to $5,000	4.5	$12,531,236	$2,784,719
Reduced Unmet Need by 1/2	3.3	$8,834,586	$2,677,147
Reduced Unmet Need to $5,000 for $5K <= Unmet Need < $15K; Reduced Unmet Need by 1/2 for $15K <= Unmet Need < $25K	3.1	$7,972,686	$2,571,834

Option 9

- Simulate the effects of an additional need-based award for ALL students with Unmet Need between $5K - $25K

- Select ≈ 200 students whose predicted retention improves the most after receiving an additional grant

- *Based on the model results, these are the students who are in the greatest need of funds to offset their Unmet Need*

- In addition to receiving the UK One-Year Grant, students received financial counseling from our MoneyCATS office

- Will be tracking these students throughout this academic year and into next Fall