



# The Power of Longitudinal Data Systems and Collaboration in Improving Postsecondary Affordability

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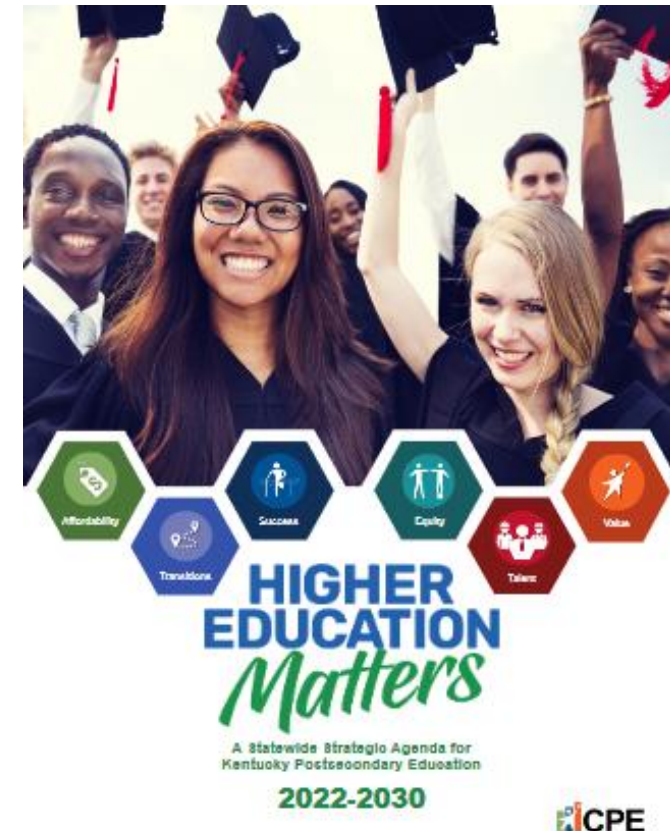
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Kentucky Council on Postsecondary Education

# Affordability: Strategic Priority

- **Affordability** is one of CPE's strategic agenda priority areas supporting the **60x30 goal**.
- To increase attainment, **higher education must be accessible and affordable**.
- **Other strategic priority areas include:**
  - **Transitions**
  - **Success**
  - **Equity**
  - **Talent**
  - **Value**

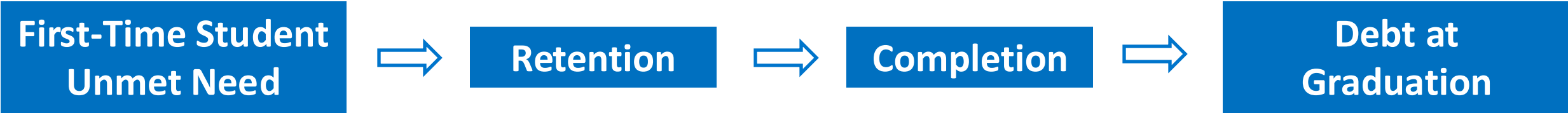


# Affordability: Data-Driven Strategy

- As we zoomed in on affordability, we had **three core questions**:
  1. For **first-time students**, how does **unmet need impact retention likelihood**?
    - What are the **financial critical thresholds** where retention becomes less likely?
  2. How can we use those estimates to **inform key performance indicators (KPIs)** we set with public postsecondary institutions to **ensure system focus on affordability**?
  3. How can we adapt the inferential model to predict student retention in real-time and empower our institutions **to assist students before we lose them**?

Over time, our statewide coordination on reducing unmet need will serve to decrease **student debt at graduation**, which is our **culminating context metric around affordability**.

# Affordability: Data-Driven Strategy



# Toward Better Metrics, KPIs, and Impact: Unmet Financial Need

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# Unmet Need: What's the Bottom Line?

- **Unmet need is a pinpoint estimate of student-level affordability challenges.**
  - **Total COA** and **net price** can muddle our understanding of affordability barriers.
  - Best practices explore how **unmet financial need** moderates the linkage between cost and enrollment behavior.
  
- **Defining Unmet Need**
  - What students are expected to pay after accounting for **EFC** and **any non-debt aid**.
  - UFN is the **precise value** at which affordability is most likely to affect enrollment behavior.

# Calculating Unmet Financial Need

**Cost of Attendance  
(Set by Institution)**

- Tuition and fees
- Room and board
- Books, supplies, transportation
- Misc. expenses

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**Expected Family  
Contribution (EFC)**

The amount students and their families are expected to be able to pay toward college based on a formula.

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**Grant and  
Scholarship Aid**

- Pell grants
- KEES money
- Scholarships
- Other aid students do not repay

=

**Unmet Financial  
Need**

The amount students and their families must pay above and beyond EFC and aid.

# Unmet Need: Maximizing Utility and Impact

- **Why first-time students?**

- Starting in the second year, next-year retention is at 90% or better. **First-time student retention is where we can make the biggest impact and close gaps.**
- Matriculating students are primarily (and overwhelmingly) most **concerned about paying for college.**

**Key Takeaway:** Affordability considerations likely exert the strongest impact on retention in the first year, when most students confront the decision to continue their studies or drop out.



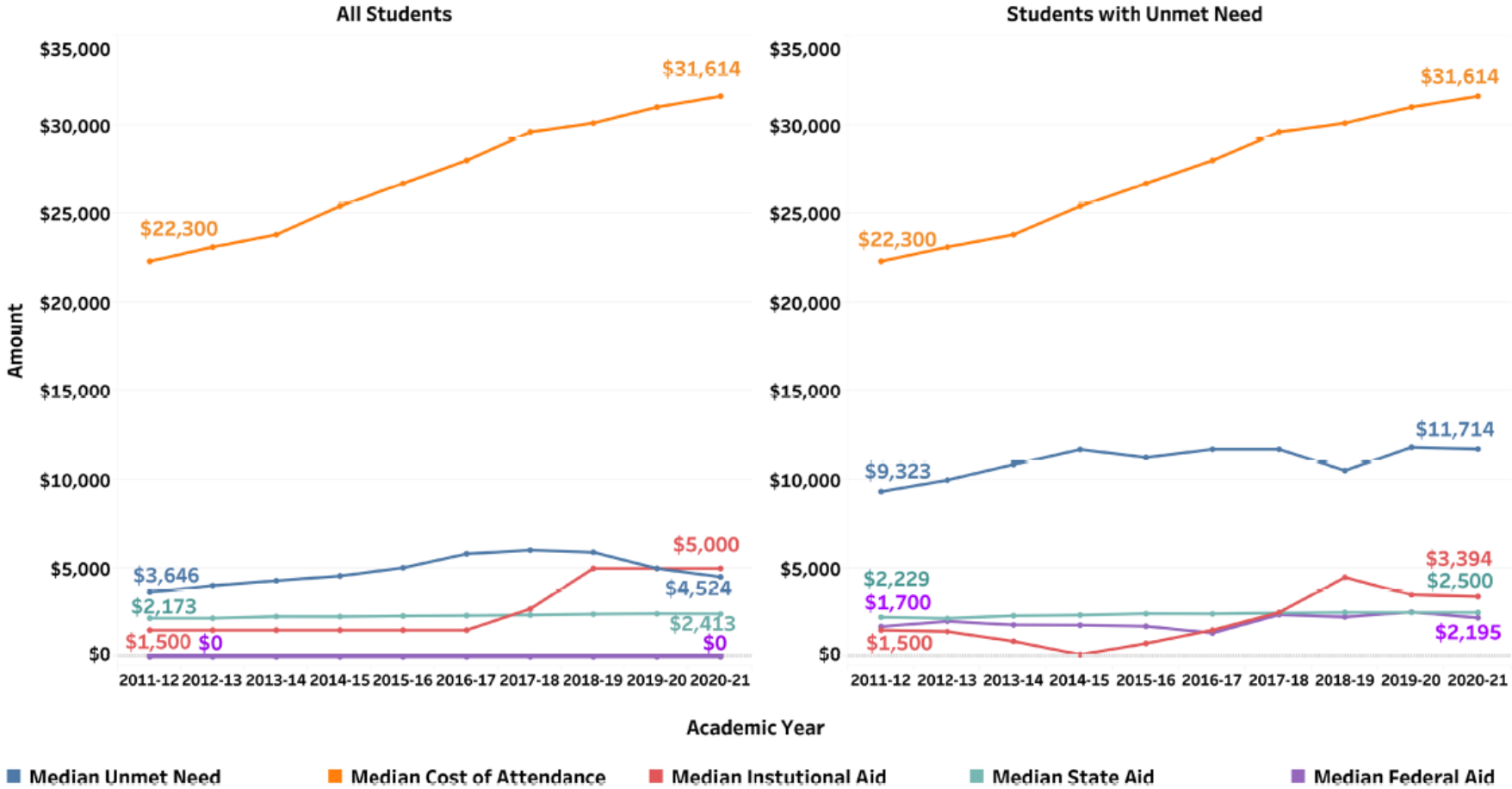
# Unmet Need in Kentucky: Trend and Demographic Highlights

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# Trend and Demographic Analysis

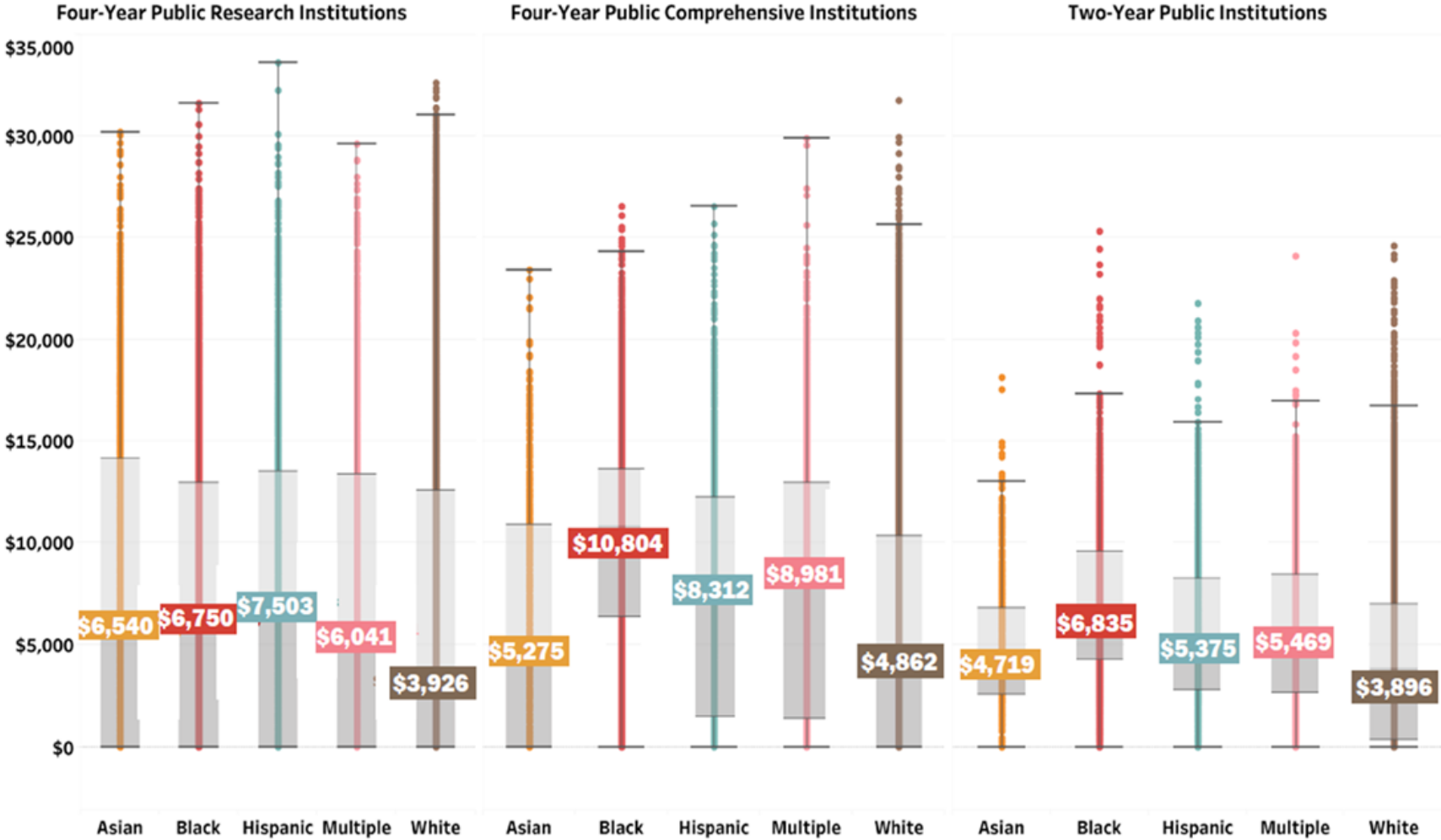
- **Sample**
  - ~ **200,000 first-time degree-seekers** in Kentucky
  - Over a **decade** of enrollment
  - Rich variance across **sector, context, and time**
  
- **Variables**
  - Unmet Financial Need
  - Cost of Attendance
  - Grant Aid – Institutional, State, and Federal

# Trends in Affordability Metrics: 4YP Research Example

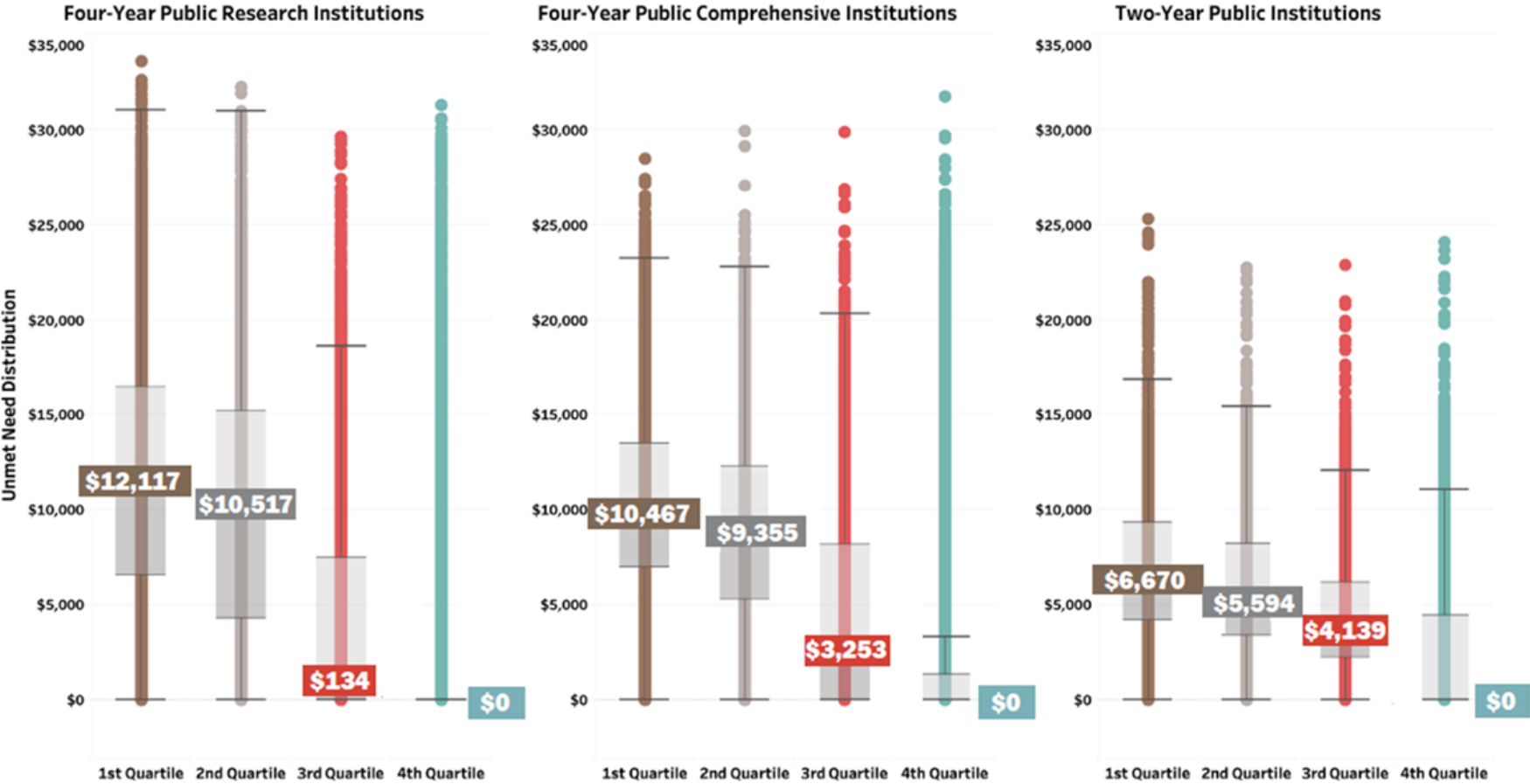


Note: In the left figure, the sample includes all first-time, degree-seeking, in-state students who filed a FAFSA and enrolled in a public, 4-yr. research institution in KY. The right figure restricts the sample to students with unmet need greater than or equal to \$1.

# Unmet Need by Race/Ethnicity and Sector



# Unmet Need by Income Quartile and Sector



# How Unmet Financial Need Impacts Retention in Kentucky

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# Structural Equation and Logistic Regression Models

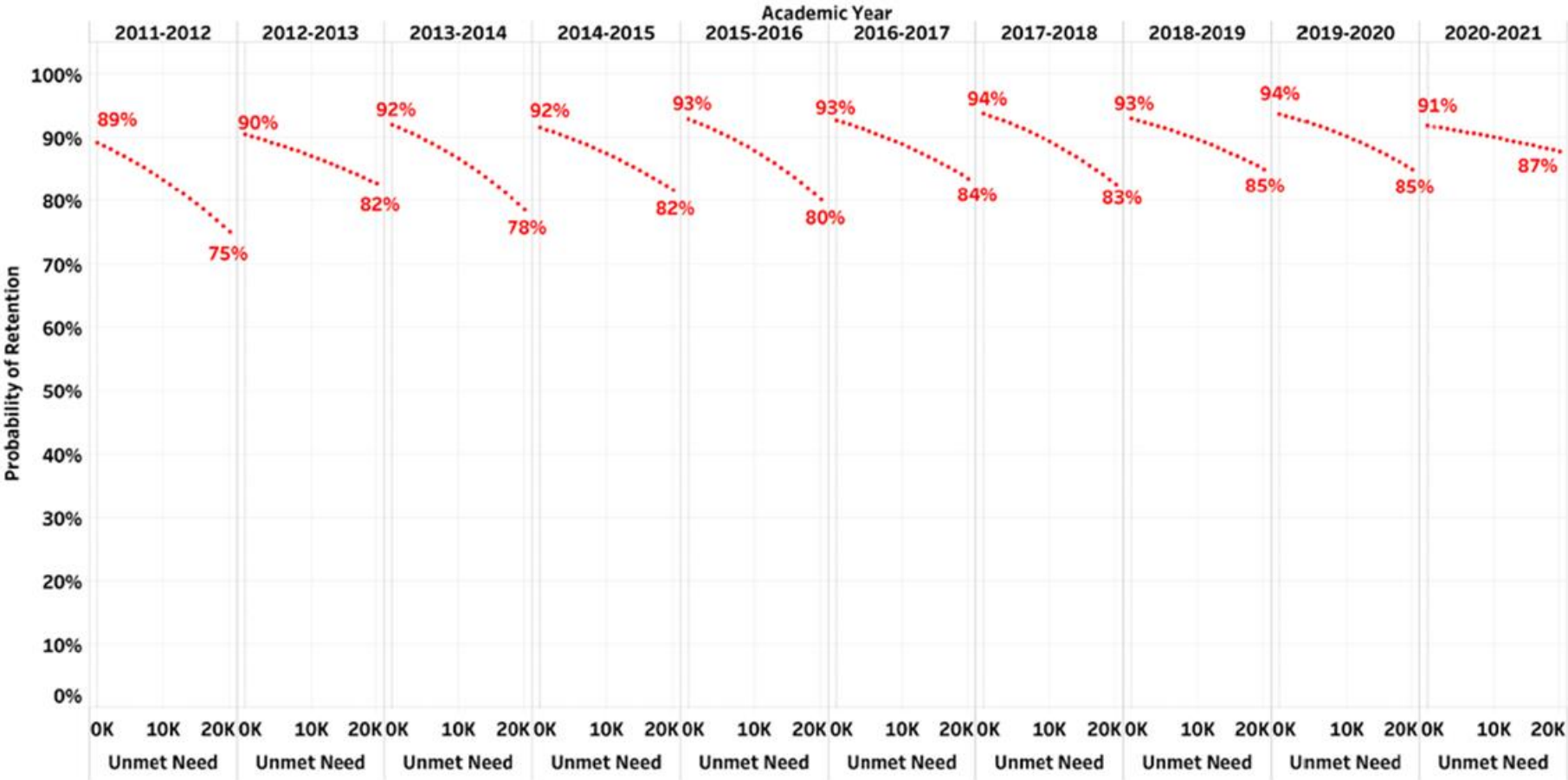
- **Sample**

- ~200,000 first-time degree-seekers
- Enrolled **Fall 2011 through Fall 2022**

- **Variables**

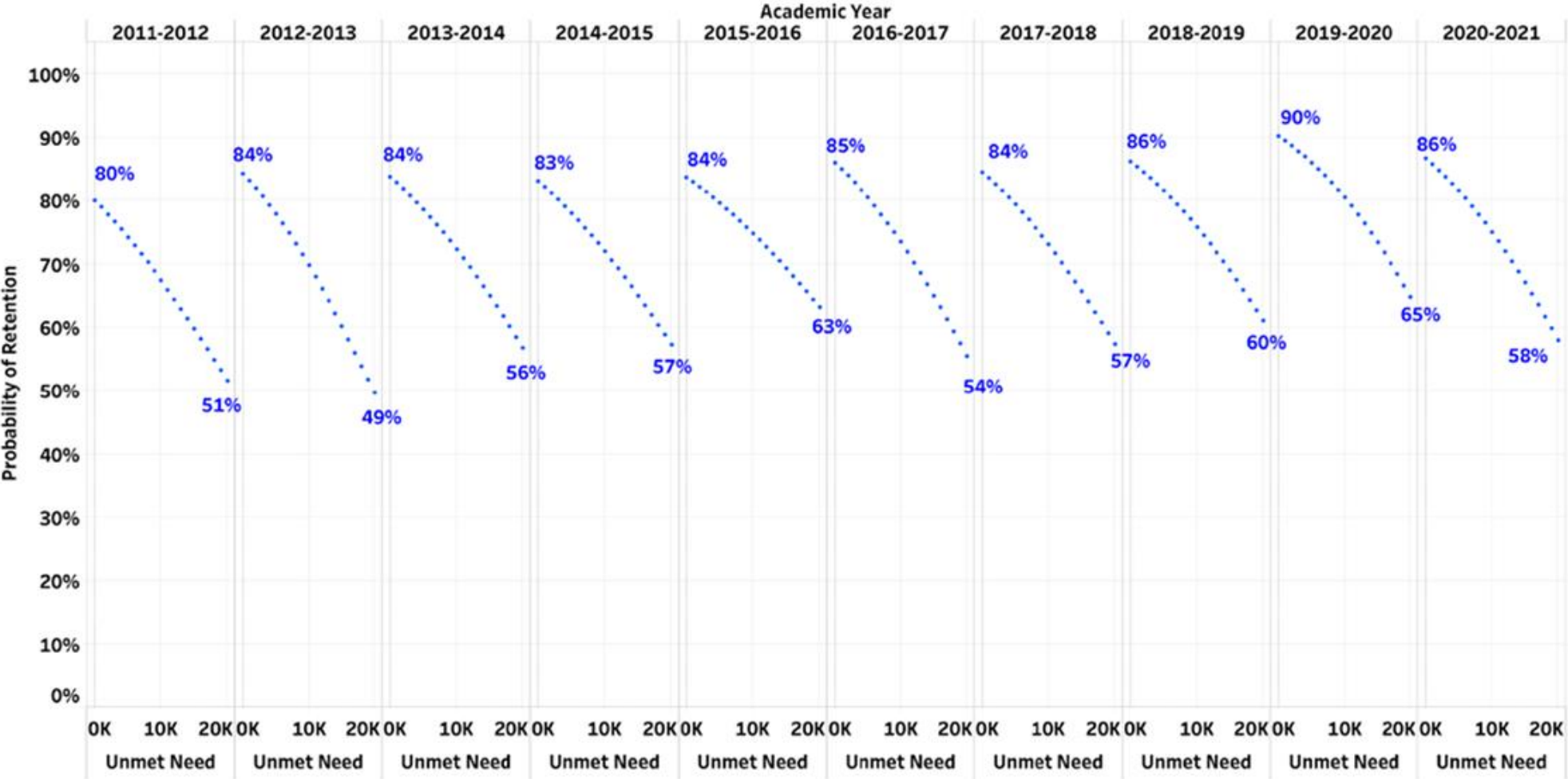
- **Level 1 Explanatory Variables:** URM, Female, Eastern Kentucky
- **Level 2 Explanatory Variables:** Dual Credit, (Under)Preparedness
- **Level 3 Explanatory Variables:** GPA, Full-Time, Unmet Need
- **Level 4 Outcome Variable:** Second-Year Retention

# Unmet Need Endangers Retention: 4YP Research Institutions

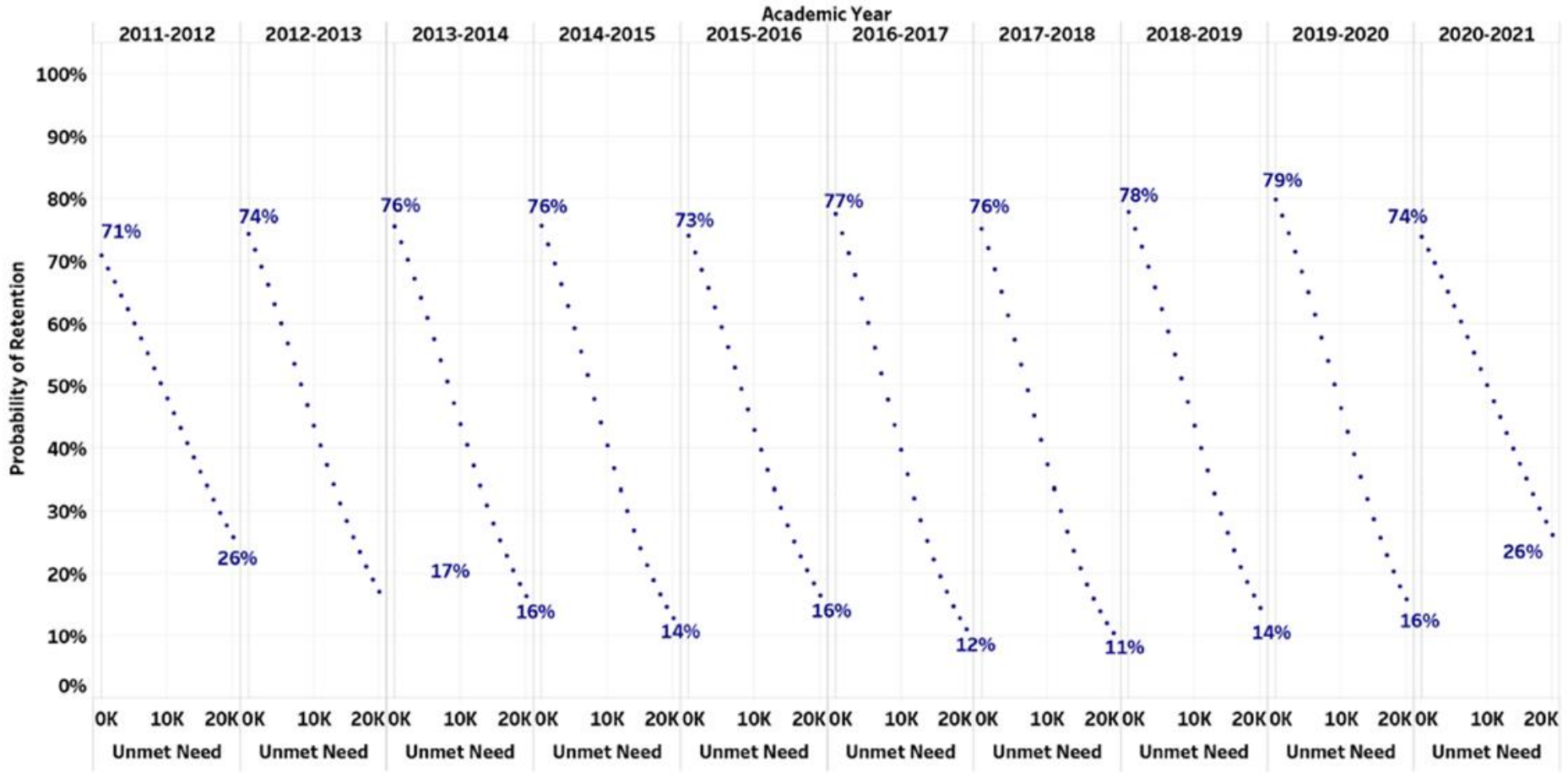




# Unmet Need Endangers Retention: 4YP Regional Institutions



# Unmet Need Endangers Retention: 2YP CTCs



# Unmet Need Endangers Retention of Students from Vulnerable Populations

Amount	Retention Likelihood: 4YP Regionals			Retention Likelihood: 2YP CTCs		
	All	URM	LI	All	URM	LI
<b>No UFN</b>	87%	87%	92%	74%	73%	82%
<b>\$5,000 UFN</b>	82%	79%	85%	63%	59%	65%
<b>\$10,000 UFN</b>	75%	69%	75%	50%	42%	44%
<b>\$15,000 UFN</b>	67%	57%	62%	38%	28%	25%
<b>\$20,000 UFN</b>	58%	43%	46%	26%	17%	12%

# Setting Data-Driven KPI Targets

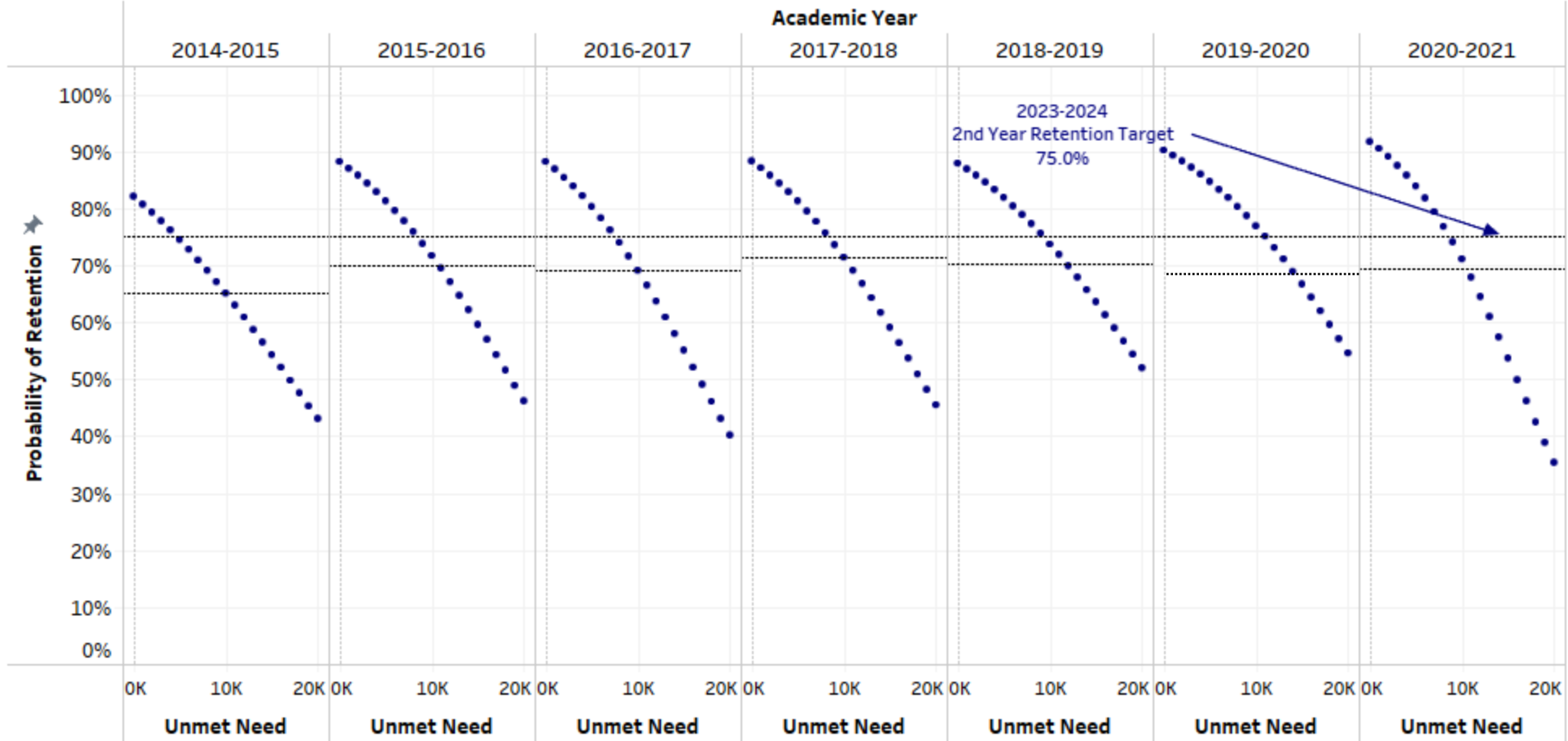
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# Impact

- **Data Outputs -> Institutional KPIs -> Impact**
  - The inferential model guides us in setting unmet need targets.
  - Targets have more empirical foundation based on where unmet need makes retention less likely relative to the institution and sector average.

# Impact

Target Setting with Red River Gorge University



# Making a Difference with Predictive Analytics

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# Impact


- **Data Outputs -> Institutional KPIs -> Impact**
  - The inferential model guides us in setting unmet need targets.
  - Targets have more empirical foundation based on where unmet need makes retention less likely relative to the institution and sector average.
  - **Putting the inferences into real-time, practical applications is how we will hit those targets and keep improving affordability.**



# Predictive Model

- **The model is estimated in R.**
  - Simple and **free to use.**
  - Communicates with **other programs**, particularly those based in SQL language.
- **Model is stored in SQL Server.**
  - This is where institutions upload all **individual-level student records.**
  - This facilitates **easy upload for end-users.**
  - Each year institutions upload data to KPEDS, **the model updates with the latest year of data.**
- **Generalizability, Simplicity, Accuracy**

# Practical Application: UI

**KPEDS-DS**  
Kentucky Postsecondary Education Data System  
Data Scaffold

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## KPEDS-DS: On-Demand Collections

**Upload File**

<input type="button" value="Browse..."/> No file selected.	<b>Description:</b> <input style="width: 90%;" type="text"/>	<input type="button" value="Upload"/>
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**On-Demand File List**

File Name	File Description	Load Date	Download	Delete
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# Practical Application: Upload

	A	B	C	D	E	F	G	H	I	J	K
1	Academic_Year	Institution_Name	Full_Time	URM	Gender	Underprepared_Overall	Dual_Credit	GPA_1st_AY	Unmet_Need	EKCEP	First_Gen
2	201112	Ledford College of Excellence	1	0	Female	0	1	2.20	\$12,707	1	1
3	201112	Ledford College of Excellence	1	0	Female	0	0	4.00	\$1,519	1	1
4	201112	Ledford College of Excellence	1	0	Female	0	0	1.90	\$13,624	0	1
5	201112	Ledford College of Excellence	1	0	Male	0	0	3.15	\$0	0	1
6	201112	Ledford College of Excellence	1	0	Male	0	0	3.27	\$8,461	0	1
7	201112	Ledford College of Excellence	1	0	Male	0	1	3.11	\$7,133	0	1
8	201112	Ledford College of Excellence	1	0	Female	0	1	3.90	\$256	0	1
9	201112	Ledford College of Excellence	1	0	Female	0	0	3.66	\$0	0	1
10	201112	Ledford College of Excellence	1	0	Female	0	1	3.20	\$12,549	0	1
11	201112	Ledford College of Excellence	1	0	Male	0	1	3.90	\$0	0	1
12	201112	Ledford College of Excellence	1	0	Male	1	0	NULL	\$14,566	0	1
13	201112	Ledford College of Excellence	1	0	Male	0	0	2.70	\$0	0	1
14	201112	Ledford College of Excellence	1	0	Male	1	0	3.11	\$0	0	1
15	201112	Ledford College of Excellence	1	0	Female	0	0	3.36	\$9,452	0	1
16	201112	Ledford College of Excellence	1	1	Female	1	0	0.85	\$11,811	0	1
17	201112	Ledford College of Excellence	1	0	Female	1	0	2.55	\$6,434	0	1
18	201112	Ledford College of Excellence	1	0	Male	1	0	2.00	\$0	0	1
19	201112	Ledford College of Excellence	1	0	Female	1	0	2.00	\$12,863	0	1
20	201112	Ledford College of Excellence	1	0	Female	0	0	2.83	\$10,673	0	1

# Practical Application: Output



	A	B	C	D	E	F	G	H	I	J	K	L
1	Academic_Year	Institution_Name	Full_Time	URM	Gender	Underprepared_Overall	Dual_Credit	GPA_1st_AY	Unmet_Need	EKCEP	First_Gen	Retention Prediction
2	201112	Ledford College of Excellence	1	0	Female	0	1	2.20	\$12,707	1	1	52.7%
3	201112	Ledford College of Excellence	1	0	Female	0	0	4.00	\$1,519	1	1	94.1%
4	201112	Ledford College of Excellence	1	0	Female	0	0	1.90	\$13,624	0	1	43.6%
5	201112	Ledford College of Excellence	1	0	Male	0	0	3.15	\$0	0	1	88.3%
6	201112	Ledford College of Excellence	1	0	Male	0	0	3.27	\$8,461	0	1	84.5%
7	201112	Ledford College of Excellence	1	0	Male	0	1	3.11	\$7,133	0	1	83.8%
8	201112	Ledford College of Excellence	1	0	Female	0	1	3.90	\$256	0	1	94.7%
9	201112	Ledford College of Excellence	1	0	Female	0	0	3.66	\$0	0	1	92.8%
10	201112	Ledford College of Excellence	1	0	Female	0	1	3.20	\$12,549	0	1	79.9%
11	201112	Ledford College of Excellence	1	0	Male	0	1	3.90	\$0	0	1	95.1%
12	201112	Ledford College of Excellence	1	0	Male	1	0		\$14,566	0	1	
13	201112	Ledford College of Excellence	1	0	Male	0	0	2.70	\$0	0	1	81.8%
14	201112	Ledford College of Excellence	1	0	Male	1	0	3.11	\$0	0	1	88.3%
15	201112	Ledford College of Excellence	1	0	Female	0	0	3.36	\$9,452	0	1	84.2%
16	201112	Ledford College of Excellence	1	1	Female	1	0	0.85	\$11,811	0	1	24.7%
17	201112	Ledford College of Excellence	1	0	Female	1	0	2.55	\$6,434	0	1	71.9%
18	201112	Ledford College of Excellence	1	0	Male	1	0	2.00	\$0	0	1	67.4%
19	201112	Ledford College of Excellence	1	0	Female	1	0	2.00	\$12,863	0	1	48.5%
20	201112	Ledford College of Excellence	1	0	Female	0	0	2.83	\$10,673	0	1	72.9%

# Impact

- **Intervention**

- This simple but robust approach helps institutions **identify at-risk students** and intervene with aid or other financial assistance **before it is too late.**
  - Inferential models provide value in setting goals, KPIs, and setting a foundation for impactful action.
  - Predictive models facilitate real-time data-driven strategies.

- **Cost Savings**

- Feedback suggests further benefits of **cost-savings** to institutions.

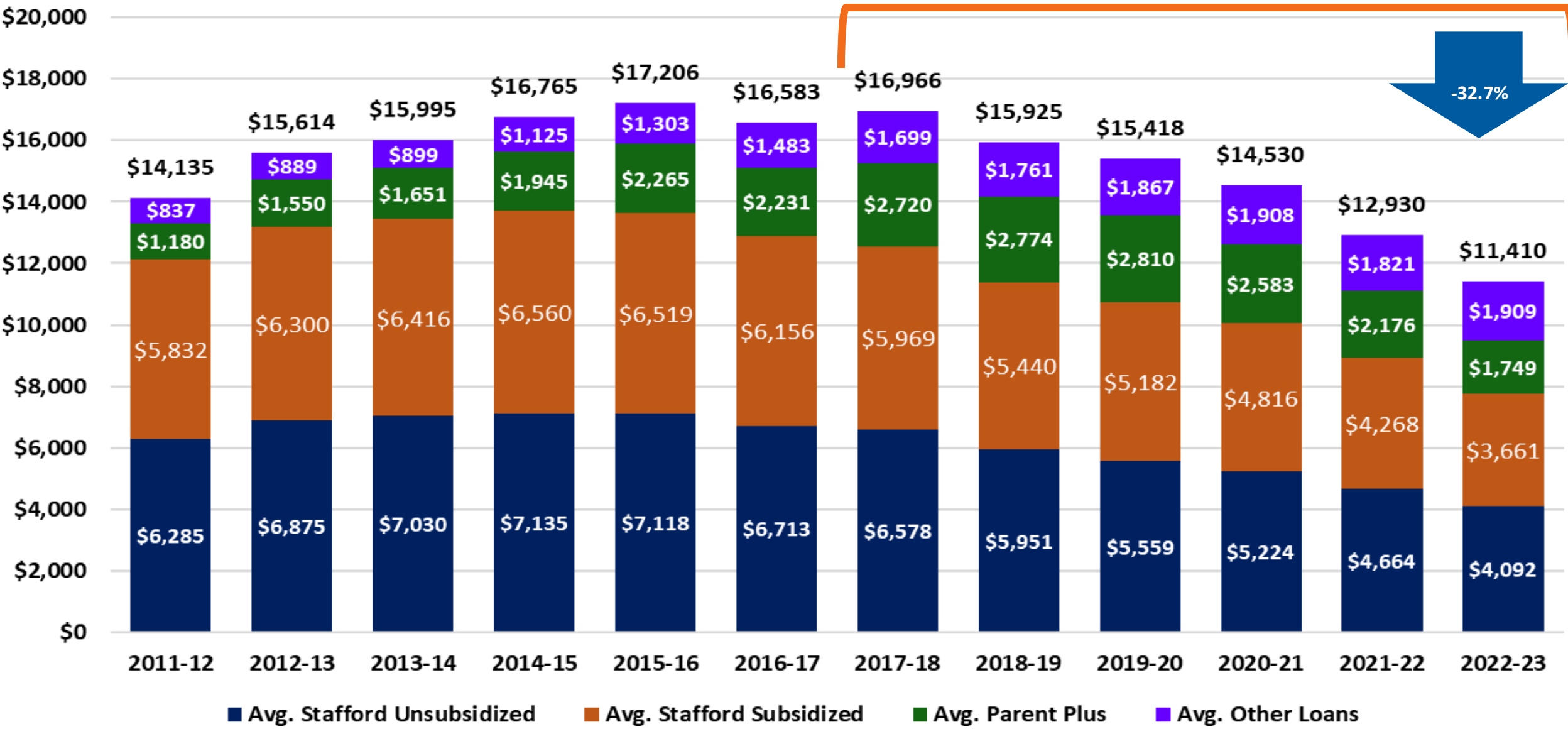
- **Cumulating Context Metric**

- System focus on **reducing first-time unmet need** will **reduce student debt at graduation**, thereby **increasing postsecondary ROI** to students and the Commonwealth.

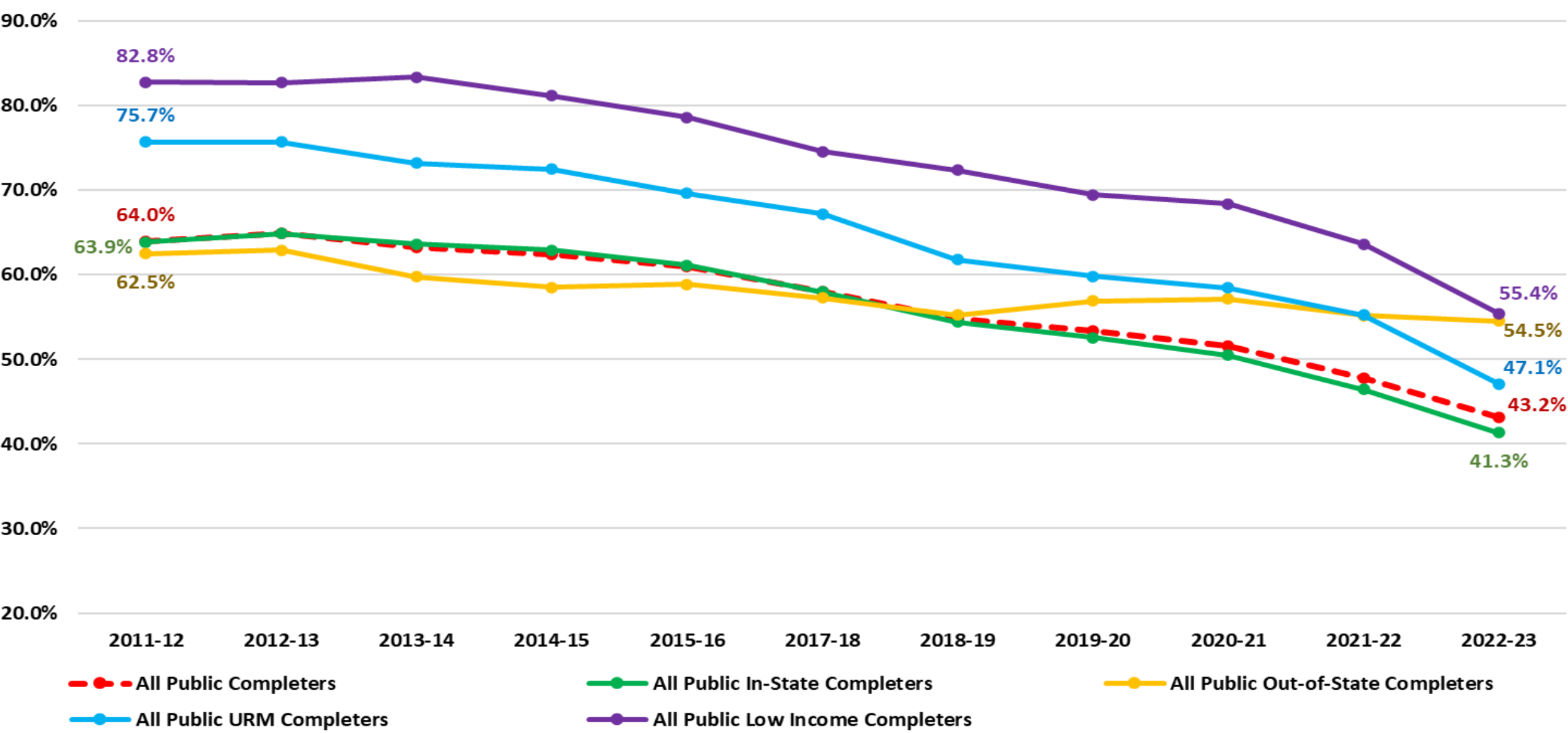
# Student Debt at Graduation

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# All Public Institutions – All Grads



# All Public Institutions – Proportions of Grads with Debt





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