Annenberg Institute
BROWN UNIVERSITY

EdWorkingPaper No. 25-1268

Comparative Cost Analyses of Community College Student Success Initiatives

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VERSION: June 2026

Suggested citation: Odle, Taylor. (2026). Comparative Cost Analyses of Community College Student Success Initiatives. (EdWorkingPaper: 25-1268). Retrieved from Annenberg Institute at Brown University: https://doi.org/10.26300/26et-xh16

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Abstract
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Keywords: community college, cost analysis, economic evaluation, student success

Acknowledgements
I am grateful for helpful feedback and recommendations from Nikki Edgecombe and Maria Cormier on earlier versions of this work, as well as comments from participants at the annual meetings of the Association for the Study of Higher Education, the Society for Research on Educational Effectiveness, and the State Higher Education Executive Officers Association. I also greatly appreciate many helpful suggestions from my editor and three anonymous referees here. Ariel Deutsch, Selena Cardona, and Jenivee Gastelum provided excellent research assistance.

Funding
This work was generously supported by Ascendium Education Group (G-202108-17286), the Bill & Melinda Gates Foundation (INV-034283), and Lumina Foundation (2105-1114299) through grants to the Community College Research Center at Teachers College, Columbia University. All statements and opinions expressed are those of the author and do not represent views of any foundation or organization.

2026.06.15

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INTRODUCTION

Community colleges serve as primary access points to higher education for a disproportionate share of low-income, racially minoritized, and first-generation students (Cahalan et al., 2024). In this way, the two-year sector has been termed an "engine of opportunity," providing students with a broad promise of social and economic mobility (Community College Research Center [CCRC], 2020). However, low and unequal completion rates persist, where roughly only 30% of students graduate within 150% of normal time—less than half that at public universities (National Center for Education Statistics [NCES], 2023a). One reason behind this wide gap are institutional resources: Community colleges' budgetary constraints mean they must spend substantially less per pupil than four-year peers (NCES, 2023b). While research and policy efforts often focus on identifying and implementing what "works" for raising and equalizing student outcomes, scarce resources also mean attention must be paid to the *cost* of such interventions (Edgecombe et al., 2024; Odle & Monday, 2021). However, research to date has largely ignored this reality. Policymakers and institutional leaders alike are often told to do something because it "works" but are left with little (if any) information on what it costs—or, more importantly—if they can afford it.

This study presents the first set of comparative cost analyses of community college student success initiatives to date. Leveraging a sample of six diverse colleges across three states and the Ingredients Method (Levin et al., 2018), I comprehensively document the costs associated with implementing and annually operating some of the most common strategies considered today, including basic needs supports, college success and career exploration courses, early alert systems, embedded tutoring, retention- and emergency-based financial aid programs,

and first-year experience programming. In addition to paying attention to overall costs, the distribution of costs across functional budget areas (e.g., personnel, facilities, materials), and costs per student served, this work also pays attention to costs borne by various actors, including in-kind resources leveraged from external partners and induced costs charged back to students themselves via time, tuition, foregone wages, or other means.

I show that, as implemented here, costs of community college student success initiatives can vary widely from as little as approximately $79,900 per year to more than $2.9 million—and range from as little as $570 per student to more than $1,320. However (and perhaps counter to common assumptions), the cost of an intervention does not appear to determine its effectiveness, its per-student efficiency, or its intensity of services. Students annually served by these interventions ranged from roughly 140 to over 3,160. Among the six interventions considered here, the one with the highest total cost is only mid-range on a per-student basis, and the most expensive program per student is among the least costly in total. Likewise, the program that objectively provides the greatest level of wraparound services for students is not the most expensive overall or on a per-student basis. I also show that, while the costs of most interventions are predominantly borne by institutions, several programs induce substantial costs from students in the form of tuition charges, time, and foregone wages—a reality that could counteractively depress retention and completion rates. Finally, I also show that many interventions rely heavily on resources provided in-kind through donations or other sources (e.g., volunteer time), representing as much as 35% of total resources. While often necessary to function, funding student success initiatives with precarious, non-recurring resources could mean that the presence and intensity of an intervention can vary widely from year to year, limiting continuity of service and mediating the impact of the initiative on intended outcomes.

Beyond estimating total costs, cost distributions, and costs-per-student for each initiative, I find that institutional budgets do a poor job of approximating these costs. As observed by prior works in other sectors (Shand & Bowden, 2022), I show that community colleges in this sample consistently underestimate costs between $150-880 *per student* on an annual basis and account for only anywhere between 23-87% of total estimated costs to the college. This undervaluation can lead to suboptimal investments by campus leaders, policymakers, and foundations alike when seeking to develop, scale, and annually operate these programs.

In all, this work makes important contributions to research and practice. Beyond providing important cost estimates for practical use in the community college sector nationally, each strategy considered has documented or emerging causal evidence at raising student outcomes. Paired with such evidence, this work equips policymakers, institutional leaders, and foundations alike with useful information to identify what programs are possible to achieve their goals (and to what level) within a given budget. These findings, discussed later in complete detail, underscore the importance of considering efficacy and cost when selecting among alternatives that may all "work" at raising outcomes, paying particular attention to the full set of resources required to implement and annually operate some of the most common community college student success strategies. This work greatly extends the nascent collection of cost analyses in higher education and lays an important foundation for researchers studying what "works" (and at what cost) at scale. In doing so, it also advances use of the Standards for Excellence in Education Research (SEER) principles by explicitly making findings, methods, and data open; identifying interventions' components; documenting treatment implementation and contrasts; analyzing interventions' costs; facilitating generalization of findings; and supporting scaling of promising interventions (Institute of Education Sciences, 2022). An Online

Appendix also features a series of summary tables and ingredient, quantity, and price lists (by initiative) alongside common cost assumptions and transformations for use by policymakers, practitioners, and foundation partners as they design and/or scale their own programs.

In what follows, I first address the current state of empirical evidence on community college student success interventions, including the relatively small set of cost and cost-effectiveness studies. I then provide an overview of the interventions in this study, as well as some brief context on each community college setting included. I then discuss methods of economic evaluation, including specific steps taken in the present cost analysis. I follow with a presentation of results, paying particular attention to overall costs, costs borne by various actors, and costs per student served. I conclude with a discussion of these findings, a comparison of total costs to campus budget estimates, and note important implications for ongoing investments, research, and policy.

LITERATURE REVIEW

Effects of Community College Student Success Interventions

A robust body of evidence has documented the efficacy of interventions at improving community college students' short and long-term outcomes, including recent work focused on synthesizing these insights for broader consumption (Reber, 2024). One primary strategy is leveraging financial aid dollars to reduce students' costs of attendance, loan burden, and need to work while enrolled (LaSota et al., 2025; Nguyen et al., 2019; Odle et al., 2021). Evidence shows that aid can causally improve enrollment, persistence, attainment, and more (Bettinger et al., 2019; Denning et al., 2019; Gurantz & Odle, 2022). Of course, there is significant variation within this body work, where the efficacy of financial aid interventions has been shown to vary across program design features, state and local contexts, and student populations (Dynarski,

Page, & Scott-Clayton, 2022). In tandem, a broader set of interventions focuses on students' non-financial needs and barriers to success, including expanded student services and those that provide wraparound supports (Dynarski, Nurshatayeva, Page, & Scott-Clayton, 2022). Evidence points to a variety of these strategies—such as advising, coaching, and other personalized efforts focused on academic and non-academic challenges—at raising student outcomes (Bray, 2023; Dawson et al., 2021). These can also include supports for academics, basic needs, mental health, and more (Bonilla & Minaya, 2024; Goldrick-Rab, 2018).

There is undoubtedly a menu of "effective" options available to campus leaders, foundations, and policymakers. However, despite efficacy, community colleges often lack funds to implement and sustain these initiatives (Vinagro, 2024). These programs—but especially those that are effective *and* address multiple barriers to student success—can be extremely expensive (Mowreader, 2024), evidenced by the widely-lauded City University of New York Accelerated Study in Associate Programs (CUNY ASAP) model that costs an *additional* $13,838 per participant. As a point of reference, the average community college spent $16,080 per student in FY21 on all instructional, academic support, and student services functions combined (NCES, 2023b). Implementing ASAP would thus nearly double expenditures per student.

Rather than relying on a primary source of revenue, community colleges rely on a mix of local, state, and federal appropriations, which typically do not cover these programs (instead focusing predominantly on instructional costs; Edgecombe et al., 2024). Likewise, efforts to secure highly competitive grants from federal or philanthropic organizations for such programs can be just as costly given institutional capacity constraints and result in funding critical student success interventions with precarious, non-recurring funds (Goldrick-Rab, 2010). Regardless of their financial position—flush with resources or facing budget deficits—all colleges face the

same challenge, however: Where do we invest our resources? What programs are effective, and what do they cost? Policymakers face similar challenges when seeking to advocate and appropriate resources for these initiatives: How much will it cost? This likewise perplexes nonprofit funders: What resources are reasonable and necessary to develop and sustain these student success initiatives? Unfortunately, there is scarce evidence to answer these questions.

Cost and Cost-Effectiveness Analyses in Higher Education

Producers and consumers broadly favor cost-effective alternatives: minimizing costs to achieve the same outcome of interest (Levin et al., 2018). Identifying such an alternative requires understanding both costs and effects. In the higher education arena, as previously discussed, decisionmakers generally have a clear idea of what effects can be expected from a given intervention. However, they have virtually no information on what that intervention may cost—and much less information on costs across a *variety* of interventions to allow for identifying the most cost-effective alternative or one that will maximize the number of students served for a given budget. As a substitute, interventions marketed as being "low cost" are often favored, but these claims beg similar questions: How were costs estimated? "Low" compared to what? Will effects be equivalent to more costly interventions? Just as researchers expect causal estimates to adhere to a specific set of requirements for claims to be valid (i.e., data quality, clear identifying assumptions, unbiased estimation, robustness), economic evaluations of cost do the same (Karoly, 2012; Levin et al., 2018; Shand & Bowden, 2022). If costs (like effects) are not rigorously and consistently estimated, they should not be used in a comparative scenario.

Many studies estimating causal impacts of higher education programs attempt to incorporate some feature of cost. This traditionally appears at the end of the paper and involves a back-of-the-envelope calculation to see if expected benefits (e.g., *n* additional graduates

multiplied by the lifetime earnings of a graduate) exceed observable costs (e.g., *n* of scholarships multiplied by the average scholarship amount). These are worthy efforts, and more studies should at least include these considerations. However, these exercises often fall short in four important ways. First, costs are not consistently estimated across studies, which may lead to systematic differences in what resources are or are not included (or what they are compared against, i.e., if spending $0 is truly the alternative). Second, they take a fiscal perspective, often only estimating costs to the government or to institutions themselves, for example, rather than costs that may also be borne by students or other actors (e.g., as in the case of programs that require student time and effort or donations). Third, they often rely on a budget model, which focuses on how resources were planned (or allocated) to be spent rather than on how they were spent or implemented (or what *other* resources were also needed). Finally, they also compute costs in a simplistic way that fails to leverage many tools available for estimating more accurate figures, such as net present value calculations that incorporate inflation, discounting, and more.

Addressing these challenges seems easier—but still not fully attainable—in a setting where costs are more obvious (e.g., scholarship dollars) than in others (e.g., wraparound services involving personnel, technology, and more). This is why virtually all back-of-the-envelope calculations focus on financial aid programs (Barr, 2019; Bartik & Lachowska, 2014; Bettinger et al., 2019; Page, Iriti et al., 2019; Page, Kehoe et al., 2019). Such a comprehensive view that addresses these challenges is indeed generally outside the scope of most impact evaluations. Nevertheless, a clear and consistent understanding of the costs of community college student success initiatives—beyond financial aid—is necessary to facilitate policy and practice conversations around cost and cost-effectiveness.

A *cost analysis* measures the total "social" value of all resources required to implement and operate a program, regardless of who pays for them (Levin et al., 2018). In the comparative sense, it answers a plain, approachable question: What is the full resource cost of each alternative? Yet, despite thousands of impact evaluations in the higher education literature, there are—quite literally—only a handful of published cost analyses of related interventions for policymakers, practitioners, and researchers to draw upon. This is due to a variety of factors, including a lack of training around economic evaluation in cost and cost-effectiveness among researchers, a lack of demand among academics to produce such estimates (given the attractiveness of impact evaluations in the publication process), the (ironically) resource-intensive nature of conducing cost analyses, and more (Levin, 2001). There are, however, rigorous cost estimates of a few signature initiatives aimed at increasing students' college retention and completion outcomes, including corequisite remediation (Belfield et al., 2016), CUNY ASAP-ACE (Azurdia & Galkin, 2020; Scott-Clayton et al., 2024), guided pathways (Belfield, 2020), and remedial education placement systems (Rodríguez et al., 2014). While these studies are few, they draw on a strong foundation of historical literature that established early perspectives on costs and benefits in education—and that continue to inform many of today's common cost assumptions, including applications to cost-effectiveness and benefit cost analyses. These include works like Bowen's (1980) *The Costs of Higher Education* and (1997) *Investment in Learning*; the Carnegie Commission's (1973) *Higher Education: Who Pays? Who Benefits? Who Should Pay?*; and McMahon's (2009) *Higher Learning, Greater Good*.

Existing cost analyses in higher education underscore the fact that the costs of programs aimed at achieving even the same outcome, such as to increase fall-to-fall retention rates, can vary widely—from as little as $30/student for placement testing and $450/student to implement

guided pathways to more than $3,800/student for co-req remediation and over $13,800/student for ASAP wraparound services. Such information can grossly change the calculus for funders, policymakers, and institutional leaders when considering what intervention(s) to consider and implement. However, these studies barely scratch the surface of possible student success initiatives under consideration. This work greatly expands this body of evidence by adding comprehensive cost estimates for six additional interventions previously unexplored.

SAMPLE AND INTERVENTIONS

Table 1 provides an overview of each intervention of interest included in the study, as well as brief indicators on each community college site. Colleges in this study were drawn from the *Paving the Way to Equitable, Adequate, and Effective Community College Funding* project at the Community College Research Center. Launched in 2021, the project aimed to identify and cost out institutional practices that drive student success; determine how state funding policies relate to adequate, equitable, and effective college funding; and build capacity to increase student attainment and reduce equity gaps (Shaw et al., 2023). Participating colleges were selected from a national pool based on their performance enrolling and graduating Black, Hispanic, and Pell-eligible students, as well as their use of evidence-based student success practices.

Six colleges from three states (California, Ohio, and Texas) were selected. Colleges underwent comprehensive engagement with the project across three years of finance and implementation studies, including 120 interviews with presidents, senior leaders, faculty, staff, and other stakeholders. While colleges were not meant to be nationally representative, they were diverse. Table 1 shows student enrollments ranged from just over 3,000 to more than 17,400 in 2022-23, with annual expenditures on instruction, academic support, and student services ranging from $10 million to nearly $200 million. Colleges also varied widely in their enrollment

of Black, Hispanic, and Pell-eligible students, and overall graduation rates ranged from approximately 20% to 45%. Importantly, however, each had robust implementation of one or more empirically supported student success initiatives.

Student Success Initiatives

One initiative per partner college was selected. Each was triangulated through (a) comprehensive interviews, questionnaires, and focus groups with institutional stakeholders, including being consistently cited as critical to the college's completion agenda; (b) having established or developing causal evidence [from the existing body of empirical evidence or from pilot programs at the college specifically] at raising student outcomes; and (c) not being the focus of a previously discussed cost or cost-effectiveness analysis (i.e., not corequisite/remedial education, ASAP, or guided pathways). Six novel student success initiatives were selected: basic needs supports, college success and career exploration courses, early alert systems, embedded tutoring, retention- and emergency-based financial aid, and first-year experience programming.

Basic needs center. College students face higher rates of food and housing insecurity than the general population (McKibben et al., 2023). Nationally, 23% of all undergraduates lack consistent access to food, and 8% experience homelessness (NCES, 2024). These rates are especially high among Black and Pell-eligible students. When students lack access to basic needs—which also include healthcare, transportation, childcare, and more—they are less likely to persist and earn a degree (Broton et al., 2022; Goldrick-Rab, 2018; Leung et al., 2020). When initiatives provide basic needs supports, students' retention and completion rates generally rise. Prior works have shown that providing students with supports to access existing public-service programs (Daugherty et al., 2016; Goldrick-Rab et al., 2021), giving food (Bond et al., 2021;

Carr & London, 2020), and providing funding for emergency expenses and/or transportation (Clay & Valentine, 2021; Dachelet & Goldrick-Rab, 2015) increase student success rates.

One Texas community college site operates a comprehensive basic needs and resource center. The center serves approximately 1,500 students annually and distributes food, clothing, and various supplies. It also disburses campus- and community-funded grants for childcare, transportation (gas cards and bus passes), and emergency issues (e.g., utility bills) while also connecting students to existing federal, state, and community resources (e.g., SNAP), including providing application assistance when required. The center has three full-time equivalent (FTE) staff members and is supported by a variety of other student and campus personnel. In addition to having a large campus footprint for receiving, storing, and distributing nonperishable food and supplies, the program also leverages off-campus spaces for food collection and distribution. Among its many grant and supply programs, the center's signature service is the distribution of nearly 116,000 pounds of fresh and frozen food annually via a refrigerated food truck.

College and career success course. Students arrive to college with varying levels of academic preparation and disparate access to financial, social, and cultural capital to navigate these spaces (Moschetti & Hudley, 2015; Roksa & Calcagno, 2010; Wells, 2008). To equip students—and especially first-generation students—with the knowledge and skills to succeed, many colleges offer "first-year experience" courses that focus on raising academic performance (e.g., study skills, time management), social integration, and "college" knowledge (e.g., navigating processes and use of campus resources; U.S. Department of Education, 2016). It is estimated that a majority of two- and four-year institutions offer at least one such course; mostly for academic credit (Young & Hopp, 2014). Many such courses also focus on major selection, college-to-career pathways, and requirement for two-to-four-year transfer. Among the available

causal evidence, research suggests that such courses raise credit accumulation and may also increase completion (Clouse, 2012; Jamelske, 2009; Shoemaker, 1995; Wilkerson, 2008).

One institutional site in Texas requires that all students complete a 1-credit hour course focused on college success skills and career exploration. The course is taught by specially trained instructors and supplemented with peer mentors. While the course surveys many topics, emphasis is placed on life skills, career and transfer preparation, and goal setting through lectures and labs. The course serves nearly 3,160 students annually with roughly 20 instructors and 8 peer mentors. These efforts are overseen by approximately two FTE alongside a faculty program director, though a variety of campus staff are engaged (e.g., career center, success coaches) given the course's focus on connecting students to existing campus and community resources. The course is offered in fully online and hybrid formats, minimizing its physical footprint. Students pay tuition for the 1-credit hour course, which, in turn, generates revenue for the institution.

Early alert. College students encounter a variety of on- and off-campus challenges that inhibit course completion, retention, and degree attainment. Advising and coaching can help address many of these challenges, but student-to-advisor ratios at community colleges can exceed 1200:1 (Karp et al., 2016; Scrivener et al., 2015). To help identify students at greatest potential for intervention—and target scarce advising resources—many institutions leverage referral programs, whereby instructors and staff "alert" the institution to students in need of support (Kalamkarian et al., 2018). Students then benefit from targeted engagement and follow-up. A majority of colleges report using some type of technology-assisted advising program, and developing evidence on early warning systems and personalized outreach suggests they can raise engagement with advisors and may have modest impacts on academic performance (Mayer et al., 2019). While early alerts in this way generally follow a *reactive* strategy, a larger body of work

on *proactive* text-based "nudges" generally points to positive effects—especially among underserved populations—when outreach is (a) delivered in timely and personalized way, (b) by a familiar individual, and (c) supports completion of a relevant task (Page et al., 2024).

An Ohio community college in our sample operates a universal early alert program where faculty and staff submit "alerts" (referrals) for students they believe are experiencing in- or out-of-class challenges; academic, financial, personal, social, or other. A team of dedicated Student Success Specialists then undertake coordinated outreach across multiple means (e.g., phone, email, text) and either provide direct advising and intervention or connect students to a host of on- or off-campus resources as necessary, including follow-up. The program is consistently touted as a key driver of student retention and success. On average, 140 alerts are received and responded to per academic year by roughly two FTE staff. The program is facilitated by a variety of technological solutions that integrate the college's learning management (LMS; e.g., Blackboard/Canvas) and customer relationship management (CRM: e.g., Salesforce) systems that allow for identification and tracking of students alongside two-way texting.

Embedded tutoring. Many students entering community colleges are classified as "academically underprepared," often requiring supplemental support through remedial/ developmental education or co-requisite instruction (Bailey et al., 2010; Nix et al., 2021). If students are unable to fully engage in coursework or face significant challenges grasping content, they are unlikely to complete the course and be retained. Across a variety of strategies that colleges employ to support students' academic and non-academic needs, one common practice is embedding tutoring (Perin & Holschuh, 2019). Embedded tutors are peers placed in students' courses—most often those who have already successfully completed the course—and primarily serve as a resource for the entire class by reinforcing course concepts, answering questions, and

providing group and/or one-on-one supplemental instruction and assignment support (Duffy & Burkander, 2024). Rather than requiring students seek out tutoring support somewhere on campus, students are "defaulted" into tutoring given an assigned peer (or professional tutor) in their class. Embedded tutors can also directly and indirectly support students' academic and social integration. Among the existing empirical evidence, studies generally point to positive outcomes of tutors on course completion, especially among first-generation, Pell-eligible, and racially minoritized students (Channing & Okada, 2020; Tucker et al., 2020).

One California community college operates a campus-wide embedded tutoring program that has grown to serve nearly 2,000 students across more than 100 courses per year. The program uses intensively trained peer and professional tutors to provide in- and out-of-class support, including weekly group review sessions and one-on-one tutoring. In spring 2024, more than 830 unique students participated in an out-of-class review session. Three FTE staff members coordinate college-wide embedded tutoring activities, including selecting, training, and overseeing approximately 70 tutors. The program also leverages a large campus footprint of classrooms for review sessions and has exclusive use of a "study skills center" that includes collaborative tables, meeting spaces, training rooms, and a computer lab. Institutional research at the college shows that students in embedded tutoring sections of a given course are descriptively more likely to complete the course than similar peers in a non-tutoring section.

Retention incentives and emergency financial aid. Affordability constraints remain one of the most pressing barriers to college completion, especially for students of color and those from low-income backgrounds (Dynarski, Page, & Scott-Clayton, 2022; Odle & Delaney, 2023). Providing students with aid can reduce costs of attendance, debt, and the need to work while enrolled—thereby increasing enrollment, persistence, and completion rates (Nguyen et al., 2019;

Odle et al., 2021; Perna & Odle, 2020). Aid can be provided in a variety of ways, including through short-term and "just-in-time" awards meant to address unexpected expenses that impede students' college progress (e.g., utility bills, car issues; Dachelet & Goldrick-Rab, 2015), as well as scholarships that incentivize higher academic achievement (e.g., GPA standards; Henry & Rubenstein, 2002; cf. Schudde & Scott-Clayton, 2016).

One institutional site in Ohio operates a suite of innovative, incentive- and emergency-driven financial aid programs focused on increasing retention and completion. Students can apply or be referred for one or more of three interrelated last-dollar scholarships that (a) cover the remaining tuition balance in a student's second year [average award of $4,000] and include a book and supply stipend [average of $200]; (b) fully cover summer tuition for degree-seeking students near degree completion [average of $850]; and/or (c) incentivize re-enrollment by covering any remaining tuition balance for returning students for up to two semesters [average of $1,300]. Students may be asked to complete a short application and essay, though requirements vary by program. However, all recipients are additionally connected to academic advisors and complete cohort-based activities. The college provides approximately 270 awards annually. The program requires minimal staffing and infrastructure (e.g., an application form and selection committee), relying almost entirely on existing financial aid processes.

First- and second-year (cohort) experience. Because community college students may face a variety of academic, financial, and social challenges, it is unlikely that an initiative addressing a single issue is enough to meaningfully improve outcomes and reduce longstanding inequalities. This has motivated many institutions to adopt holistic initiatives that target multiple barriers to success (Karp, 2016). These programs typically involve some combination of advising, career exploration, case management, continual outreach, and specialized programming

for a defined group of students, as well as close connections and referrals to campus resources (Edgecombe et al., 2013). These programs may also provide common experiences through cohort-based activities, including through introductory "college knowledge" or career exploration courses (Bers & Younger, 2013). Many of these occur as soon as students enroll, terming them "first year experience" (FYE) programs; many of which continue into their second year (SYE). Evidence on holistic support practices like these across students' first and second years is strong, where students receiving holistic supports have, on average, higher GPAs and are more likely to graduate on time (Acevedo-Gil & Zerquera, 2016; Dynarski, Nurshatayeva, Page, & Scott-Clayton, 2022; Jamelske, 2009; Noble et al., 2007).

A community college in California operates a cohort-style FYE and SYE program that provides students with holistic retention and completion supports, including priority course registration, personal student success coaching at least twice per semester, customized academic and career advising at least once per semester, access to specialized programming, and a dedicated space in a Student Success Center. College success courses and peer mentors are also available. The program is consistently touted as a key driver of student retention and success at the college, and a small-scale randomized controlled trial at the institution showed positive impacts on student satisfaction and completion, leading the college to scale the program. Across first- and second-year cohorts, the program supports roughly 560 students annually. Given such wraparound services, the program is staff-intensive with roughly six FTE and requires a meaningful physical footprint for offices, programs, and related spaces.

METHODS FOR COST ANALYSIS

I leverage Levin et al.'s (2018) Ingredients Method to generate a series of comparative cost analyses of these six common student success initiatives. This method is regarded among

the most rigorous of cost tools in economic evaluation given its accuracy and authenticity by directly embedding the principle of opportunity cost into estimation (Levin & McEwan, 2001). The Ingredients Method begins by first identifying all "ingredients" required to implement and operate a program, regardless of who provides them. Ingredients can include people (personnel), places (facilities), things (materials and supplies), and more. This includes identifying resources on the *extensive* margin (i.e., what ingredients exist), as well as the *intensive* (i.e., how many/what quantity of each resource is used). The method then collects and applies resource values (or "prices") to each ingredient-quantity pair under the assumption that each ingredient has another productive use; that there is an opportunity cost of "using it up" here. Prices generally reflect costs in a national marketplace but can also reflect regional variations or other important features, such as the *quality* of ingredients (e.g., the price of a college mentor with a master's in counseling psychology will be higher than the price of a peer volunteer counselor—an important difference if master's-level counselors are required to produce program effects). The Ingredients Method concludes by summing resource costs to arrive at a total social value for a program, which can then be distributed on a per-student or per-payor basis.

A naïve estimate of an initiative's total present value would simply take the budget assigned to that initiative, often from institutional records. However, budget-driven cost models can provide an inaccurate and incomplete picture of resources and costs (Hollands et al., 2016). Budgets often focus on how resources were planned (or allocated) to be spent rather than on how they were actually spent or implemented (or what *other* resources were also needed). Budgets also often do not capture ingredients shared across multiple programs, ingredients purchased at the beginning of a program that last multiple years (e.g., technology), or ingredients donated by other parties or considered "free" to the program (Levin & McEwan, 2001). Budget models often

also do not amortize costs of capital items across years (if they are captured at all; e.g., facilities) and generally reflect local prices rather than prices set on a national marketplace, limiting generalizability (Shand & Bowden, 2022). Finally, budget-driven cost estimates also often fail to consider two critical sources of cost that can be essential to program operations: induced and in-kind costs (Bowden et al., 2017; Bowden et al., 2020).

Induced costs. Many interventions in education "work" by inducing behavior (Bowden et al., 2017). This can be through encouraging students to complete tasks that are then associated with subsequently positive outcomes (e.g., nudging students to complete enrollment steps induces them to spend time and resources on those tasks [a cost], which, in turn, increase enrollment; Page et al., 2024). Those induced behaviors are costs borne by students in service of producing subsequent outcomes. Failing to account for these costs misses a critical ingredient required to produce the desired effect. That is, if such students did not complete those enrollment tasks, they would not subsequently enroll. They are thus captured as "induced" costs, a necessary input. A common example of induced costs in higher education includes student time, such as when they are required to enroll in courses, meet with advisors, or generally spend time on something that displaces other productive uses of time, such as working (i.e., a direct opportunity cost). Without time or other resources spent by students on given tasks, an initiative is unlikely to perform as designed—and estimates of the total value of resources it requires could be grossly undervalued. The Ingredients Method makes induced costs explicit (Bowden et al., 2020).

In-kind costs. Recall that the Ingredients Method takes a social perspective on program costs, meaning that all resources required to operate a program are included, regardless of who pays (Levin et al., 2018). For example, the basic needs center considered here distributes approximately 116,000 pounds of fresh and frozen food annually. While 100% of these materials

are donated—representing a $0 direct cost to the college—these resources are vital to the success of the program. Failing to include these would grossly discount the true cost of the basic needs center, producing a cost estimate that does not actually reflect the resources required to operate (or replicate) the present iteration of the program. That is, just like with the example of induced costs, the center is unlikely to be as successful as it is without 116,000 pounds of food to distribute, an in-kind cost. They are thus captured as "in-kind" costs to society (donated). While the college in this sample receives 100% of food through donations (thus paying $0), it is possible another college may be required to purchase (or fundraise for) all or part of these costs. Capturing total cost in this way through the Ingredients Method allows us to examine the total required resources for an initiative, allowing campus leaders, policymakers, and funders to *then* consider how those costs will be covered (Hollands et al., 2014).

Collecting Student Success Ingredients

Colleges' existing engagement with the CCRC *Paving the Way* project provided the ideal opportunity to conduct a comparative cost analysis. The cost research team began by closely reviewing the prior year's finance and implementation studies of each college. These included interviews and focus groups of 120 presidents, senior leaders, faculty, staff, and stakeholders, covering discussions with at least 12 individuals (mean: 17) per site on a variety of topics, including the college's budget, priorities, student success outcomes, political environment, and more. This work produced a host of intermediate project materials, including briefs that summarized, among others, each college, its budget, and student success initiatives. After identifying one initiative per site to cost-out, the cost team collected additional information on each initiative from college websites, other electronic sources, and print material—paying particular attention to program operations, design features, staffing, number of students served,

evidence on efficacy, and more. This information was used to build program-specific resource questionnaires and semi-structured interview templates for each college (Hollands et al., 2014).

From fall 2022 through fall 2024, the cost team conducted two 1-hour interviews and/or focus groups with at least 2 individuals per site (mean: 4; total of 25). At least two members of the research team were present at each conversation. Engagement with each site was individualized and sequential; no two cost studies were completed concurrently. We relied on existing relationships with senior leaders at each institution to secure conversations with as many program-specific staff as necessary at achieve saturation. Conversations prioritized day-to-day personnel, including directors, coordinators, volunteers, and others, and focused on closely understanding each program's operation and implementation. Here, we identified ingredients alongside their quantities, use, and any special features (e.g., quality, such as personnel training and qualifications), paying close attention to *quantities* of each ingredient. That is, many "directors" oversee multiple programs or perform several duties across campus. Thus, we captured only their share of time used for the initiative in question. Similarly, we partitioned only the share of space, materials, and/or time that a given initiative required of an ingredient (e.g., 1 hour per week of a 900-sqft classroom versus total annual use); similarly for materials and supplies (e.g., technology and licenses associated only with the given initiative's use). We also paid particular attention to the contrast—or what would be "business-as-usual" operations (Bowden et al., 2020)—identifying only which resources were absolutely required to implement the initiative in question (e.g., not including time for general "professional development" required of all staff, which would still exist in absence of the program). These conversations, as well as their recorded transcripts, refined a follow-up, program-specific resource questionnaires.

Guided by the cost team, program staff at each college then completed questionnaires to refine the ingredients list, their quantities, qualities (if applicable), and comprehensively describe the implementation and operation of each initiative. Throughout our focus groups, interviews, and questionnaires, the cost team also paid particular attention to capture any ingredients that may represent induced resources required from students or others (e.g., time), as well as any in-kind resources provided by external parties (e.g., donations, volunteer work). We then conducted a final 1-hour conversation with each site to refine final ingredient lists.

Identifying and Applying Prices

Guided by prior economic evaluations leveraging the Ingredients Method (Bowden, et al., 2017; Bowden et al., 2020; Hollands et al., 2016; Hollands et al., 2014), as well as empirically established common cost assumptions (Shand & Bowden, 2022), I then priced each ingredient. Because most personnel supporting these interventions are higher education employees, I leveraged the latest College and University Professional Association for Human Resources (CUPA-HR) Salary database for personnel expenses. The survey averages annual salaries for over 750 staff positions (by title) across more than 1,110 institutions (by sector), as well as instructional salaries in 46 academic disciplines. I captured the salary for the closest related title in the "associate's" sector. There was an associated CUPA-HR salary for every ingredient. For compensation of student workers and students' induced time and effort, I used a $7.25 federal minimum wage from the U.S. Department of Labor.[1] The federal minimum wage was also used for any volunteer time unless it was specified that volunteers needed to possess a specific level of

[1] While the minimum wage varies across states, consistently using the standard federal minimum wage facilitates comparisons across programs. Mixing different local prices can induce artificial cost differences between two otherwise equivalent initiatives (Levin et al., 2018; Shand & Bowden, 2022). This analysis estimates comparable national prices, but readers can leverage the Online Appendix to estimate prices based on any altered assumption, including to generate local estimates of a program's cost. Users can simply insert a state-specific minimum wage alongside college-specific salaries and any other desired change (e.g., altered facility costs, discounting/amortization over a different lifespan, assume an ingredient will be provided in-kind versus borne by the institution).

education and/or training, in which the closest related CUPA-HR salary was used (e.g., professional tutor; Hollands et al., 2016; Shand & Bowden, 2022). Prices for personnel time were used for individuals' direct assignment to an initiative, as well as any additional time spent on specialized training and development and/or related induced or in-kind time.

Prices for facilities were drawn from the Center for Benefit-Cost Studies of Education's (CBCSE) CostOut/E$timator tool and its *Database of Educational Resource Prices*. I drew price-per-square-foot values for related facilities for the latest year available (e.g., "Student Services Building"). CostOut/E$timator prices are based on facility replacement value, capturing site preparation, construction, fees, and furnishings and are supported by related sources (Shand & Bowden, 2022; Hollands et al., 2016).

Prices for materials and supplies, such as technology and specialized furnishings or equipment specifically required for an initiative, were also drawn from national sources (e.g., Amazon, Staples, ULINE) and kept constant across initiatives to maximize comparability. Per-pound prices for food were generated from the U.S. Bureau of Labor Statistics' *Average Retail Food and Energy Prices, U.S.* report based on (a) a typical box of nonperishable food provided to each student, which included 2 pre-packaged meals, 4 packets of tuna, 1 boxed mac and cheese, 1 box of pasta, and 4 canned goods, and (b) a typical 10-pound bag of perishable food provided to each student, including 40% fruits and vegetables, 20% grains, 20% protein, and 20% dairy. Because many interventions also relied on institutional licenses for LMS and CRM systems, I took the colleges' total license costs and divided by the number of users or students for each initiative to arrive at a per-user or per-student price (Shand & Bowden, 2022). Additionally, costs for transfers (e.g., tuition and fees) were taken from national sources, such as the national average per-credit-hour cost of tuition at community colleges (Ma et al., 2024). The

only locally sourced price was for financial aid dollars, which reflect the actual value of scholarship dollars given on a per-student or per-award basis (e.g., average award of $850).

All ingredients (by individual line), quantities, and related prices were captured in template spreadsheets taken from the CBCSE's online toolkit. Following guidance from Levin et al. (2018) and empirically established common cost assumptions (Shand & Bowden 2022), I transformed price data in four important ways to arrive at more accurate and generalizable cost figures. First, I applied the most recent national average fringe benefit rate (38.1% of total wages from the U.S. Bureau of Labor Statistics) for all non-volunteer, non-student personnel costs to arrive at a total compensation value for each personnel ingredient. Second, because some prices were captured in different years (e.g., 2020 CUPA-HR salary, 2021 CostOut/E$timator facility rate, 2022 market price from Staples), I adjusted all prices to constant 2024 USD using the Consumer Price Index. Third, for any licenses, capital (facilities), equipment, and technology leveraged over multiple years, I applied an annual discount rate of 3.5% and amortized facilities over 30 assumed useful years, equipment over 7 years, and technology over 5 so that only their per-year share is captured in the present value (Shand & Bowden, 2022). Finally, I transformed prices to match units of each ingredient quantity collected as necessary (e.g., salary to an hourly rate or percentage of FTE, licenses per student, sqft-hours of facility use). Reported figures represent the total cost of a single fiscal year of operation for each initiative, placing those that run on different schedules (e.g., academic year only v. academic year plus summer) on a common annual basis for comparison. Summary tables; complete ingredient lists with quantities, related prices, and sources for each initiative; and an accounting of all assumptions and cost transformations are included in an Online Appendix.

COST ESTIMATES

Results are presented in Tables 2 and 3. Table 2 includes the total present value for each of the student success initiatives as implemented at the sample of colleges in this study. In addition to the annualized cost, Table 2 also presents the total cost per student served and the distribution of costs aggregated in five common budget categories: personnel, training, facilities, materials and supplies, and other. Table 3 then disaggregates total initiative costs by actor, identifying costs to the college ("direct"), costs to students ("induced"), and costs to society ("in-kind"). Recall that the Ingredients Method takes a social perspective on program costs, meaning that all resources required to operate a program are included, regardless of who pays (Levin et al., 2018). Table 2 captures this total value of all resources; Table 3 then distributes those by "who pays" as implemented at the current sample of colleges, which could vary in other settings. While this analysis focuses on the total social cost of each initiative, policymakers and institutional leaders may be less concerned with the total *social* costs of a program and instead want to focus only on the costs *they* will bear; what resources they must allocate. This divergence is what Levin et al. (2018) and others refer to as the "fiscal" perspective in economic evaluation. That view is also directly accessible here: The "Cost to the College" column of Table 3 isolates only the resources these institutions provided for program operations, separating them from costs induced from students (e.g., tuition, foregone wages) or contributed in-kind.

Total Present Value and Cost per Student

As implemented, the cost of student success initiatives in this collection varies widely from as little as $79,900 per year to more than $2.9 million—and ranges from as little as $570 per student to more than $1,320. Annual program costs for each initiative include $1.07 million for a basic needs and resource center, $2.90 million for an institution-wide college success and career exploration course, $79,900 for an early alert system, $2.48 million for a scaled embedded

tutoring program, $357,500 for retention- and emergency-based financial aid programs, and $671,200 for an FYE-SYE program (Table 2).

Just as costs vary, so too do the number of students served; from 140 in early alert as implemented to roughly 3,160 in the college-wide college and career course. Recall, features of each initiative here are *as implemented at these community colleges*. That is, early alert could be designed to serve more than 140 students; a financial aid program may only be able to serve 100 students (versus 270). However, understanding total costs given a specific number of students served here allows us to recover a cost-per-student estimate for each initiative that can help model total costs given a larger (or smaller) number of students. Total annual costs per student are estimated to be $712 for a basic needs center, $918 for college and career courses, $571 for early alert, $1,246 for embedded tutoring, $1,324 for financial aid, and $1,199 for FYE-SYE.

Distribution of Costs

Table 2 shows the distribution of resources across common budget categories. Given their heavy student-facing design, three initiatives place a majority of resource costs on personnel: early alert, embedded tutoring, and FYE-SYE. Over 80% of costs for early alert as implemented cover the approximately two FTE staff members who coordinate the program and respond to roughly 140 alerts per year, spending between 15-20 minutes on each interaction. Other costs include office space and technology to identify, track, and text students. Similarly, 78% of costs (or over $1.9 million) for embedded tutoring are in personnel: roughly $1.39 million for 70 professional and student tutors who serve nearly 2,000 students across 100 courses annually; $328,800 for three college FTE plus additional support staff who coordinate the program and select, train, and oversee tutors; and $208,800 in induced costs to the more than 830 unique students who participate in out-of-class review sessions and one-on-one tutoring

throughout the semester. Other costs include classrooms and meeting spaces for program operations, group review sessions, and individual tutoring; tutor training; and materials, including supplies and software. The holistic nature of FYE-SYE programming also requires an emphasis on personnel (81%), including roughly six dedicated FTE plus additional college-wide staff. As implemented, FYE-SYE also leverages a large campus footprint for offices, programs, and a related Student Success Center with a lounge and study space with computers and printers.

Personnel-intensive initiatives like early alert, embedded tutoring, and FYE-SYE provide students with direct services and experiences. Other initiatives focus on providing students with resources, including basic needs and financial aid. Unsurprisingly, this means the basic needs center and financial aid programs considered here place most resource costs in materials and supplies. While the basic needs center requires roughly $388,200 in personnel for three FTE and support from a variety of other student and campus personnel, nearly $583,000 (or 55% of costs) cover the direct transfer of resources to students: roughly $372,200 in food and food scholarships, $95,000 in childcare grants, $61,100 in emergency financial aid, $48,400 in transportation support, $3,100 in clothing, and $2,800 in program supplies and operations, including food storage and distribution. Other expenses include physical space on- and off-campus for receiving, storing, and distributing food and supplies. Likewise, 89% of costs for the retention-incentive and emergency aid programs considered here are in direct scholarships to students and technology required to facilitate scholarship applications and awards. Other costs include personnel time and space for administration and selection of recipients.

The greatest-cost program here is the college and career success course. Recall this is an institution-wide initiative requiring all students to participate. A little over 58% of costs (or $1.69 million) are in personnel: roughly $678,100 for two program FTE alongside a faculty program

director, 20 instructors, 8 peer mentors, and support staff across campus (e.g., career center, success coaches). This cost also includes $1.01 million in induced costs to the 3,160 students who are required to participate in the 1-credit hour course. In- and out-of-class commitments of time represent opportunity costs for students (e.g., foregone earnings, time away from other courses). Because the course is offered in fully online and hybrid formats, there is a minimal physical footprint, but there are substantial costs ($141,500 or 5%) for materials, technology, and institutional licenses required to operate the course (e.g., Google Suite integration, portable laptop stations). While there is minimal training for the program, there is another important and unique cost component: tuition and fees. Students are not only required to enroll and complete in- and out-of-class course-related activities but also pay tuition for the 1-credit hour class. This revenue is expected to amount to roughly $1.01 million annually (or 35% of total resources).

Cost Burden

Table 3 disaggregates total success initiative costs by actor, identifying costs to the college, costs to students, and costs to society (broadly defined). A majority of resources are provided by colleges themselves for all but one initiative: the college success and career exploration course, where students bear a majority of costs (69%) through time and tuition and fees. These tuition and fees represent an important resource-transfer between actors in this scenario. Students provide (a) time *to the program* (which, in turn, produces effects; if students did not participate, the course would have no associated impacts) and (b) tuition and fees *to the college*. Viewed from the social perspective, tuition here is an induced cost borne by students and must be captured as a required ingredient. Viewed from the institutional perspective, however, the same dollars are revenue: The college pays $885,300 to operate this course (also captured as a required ingredient) but also *receives* roughly $1.01 million in tuition paid by those

students who enroll. This yields a net *gain* to the institution of roughly $122,200. Accounting for this cost transfer is important because, while tuition is only counted once in estimating present values here (paid by students), it could have a material impact on how state or institutional decisionmakers consider investing in this initiative. While the college must still dedicate roughly $885,300 to the program, its *net cost* is not merely zero but negative—the program is revenue-generating, yielding the roughly $122,200 gain noted above.[2] As noted above, this framing diverges from the social perspective and follows a fiscal perspective; focusing only on costs and benefits for the institution alone. Nevertheless, the total inputs of students and total inputs of the college must be captured under the social perspective as uniformly applied here.

As implemented at these institutions, colleges provide (from internal funds, gifts and grants, or any other source) 65% of resources for a basic needs center, over 99% of resources for early alert, 92% for embedded tutoring, 85% for retention- and emergency-based financial aid programs, and 98% for FYE-SYE. Students provide less than 1% of resources valued for early alert through engagement with outreach, 8% for embedded tutoring through out-of-class review sessions and one-on-one tutoring, less than 1% for emergency aid through application time and engagement with follow-up coaching, and approximately 2% for FYE-SYE though required meetings with coaches and counselors.

Many resources are also provided in-kind. Roughly 35% of resources for the basic needs center are donated from external sources, including $365,300 in food and supplies, as well as $3,000 in clothing. Likewise, roughly 14% of funds for the retention- and emergency-based scholarships themselves were provided by the local community. It is advantageous for colleges to leverage resources such as these from external sources. However, this setup also comes with

[2] See the Online Appendix for a full accounting of this cost transfer.

its own "cost:" Funding critical student success programs with precarious, non-recurring resources could mean that the presence and intensity of the intervention can vary widely from year to year (e.g., a scenario when 116,000 pounds of fresh and frozen foods are *not* donated in a given year). Such a scenario would shift a significant cost burden onto the college to maintain total program resources—or downsizing the program to match available resources may not produce equivalent effects as those observed at other institutions or experienced in prior years.

DISCUSSION

Implementing student success initiatives in the resource-constrained community college sector requires not only paying attention to what "works" at raising and equalizing outcomes but also to "at what cost." Higher education research to date has largely ignored this reality, leaving policymakers and institutional leaders alike with little (if any) information on what even very common initiatives cost—and what it takes to truly implement and operate them. To advance policy and practice, this study provides the first set of comparative cost analyses of community college student success initiatives to date. I focus on comprehensively identifying the costs associated with implementing and operating six widely adopted (and effective) initiatives. By examining basic needs supports, college success and career exploration courses, early alert systems, embedded tutoring, retention- and emergency-based financial aid programs, and first-year experience programming, this research not only fills a critical gap in the literature and but also equips policymakers, campus administrators, and foundation partners with useful information to make informed decisions about allocating resources to support student success.

Findings reveal significant variability in annual costs, which range from as little as approximately $79,900 per year to more than $2.9 million annually—and from as little as $570 per student to more than $1,320. The annual number of students served also varies from roughly

140 to over 3,160 across initiatives. This variation in resources and capacity underscores the need for institutions to carefully consider program design and scale to ensure cost-efficiency while maintaining the effectiveness of these interventions as established in prior works. Results here also suggest that a program's total cost and its per-student cost are somewhat decoupled: The initiative with the highest total cost is only mid-range on a per-student basis among the alternatives here, while the most expensive program per student is among the least costly in total. This challenges the assumption that higher per-student spending automatically reflects broader reach or greater intensity of services. In fact, the program that objectively provides the greatest level of wraparound and continuous services for students (FYE-SYE) is not estimated to be the most expensive overall or on a per-student basis, challenging the assumption that wraparound services are unattainable or cost-prohibitive given prevailing knowledge of CUNY ASAP's expensive (but effective) model (Azurdia & Galkin, 2020). These collectively highlight the importance of researchers and decisionmakers alike assessing not only cost but also intended populations and targeted program outcomes.

In addition to documenting total costs and costs per student across a variety of common student success initiatives, this work also illustrates how resources are allocated across functional areas and how ultimate costs are widely distributed among various stakeholders, including in-kind contributions and induced costs, emphasizing the multifaceted nature of funding community college initiatives. While the costs of most initiatives are predominantly borne by institutions (i.e., basic needs, early alert, embedded tutoring, financial aid, and FYE-SYE), the focus of the initiative determines how those resources are spent: many are personnel-intensive that provide students with direct services and support (early alert, embedded tutoring, and FYE-SYE), where 78% to 82% of costs are in personnel, compared to others that provide students with goods and

resources (basic needs and financial aid), where 55% to 89% of costs are in materials and supplies. Additionally, all but one initiative (basic needs) induces student behavior (e.g., meeting with tutors, coursetaking, responding to alerts, completing applications, paying tuition, and engaging in cohort-activities) that represents a substantial cost, ranging from as little as $300 annually to more than $2.01 million. These costs could counteractively depress retention and completion rates if they displace time students could spend in other courses or on other activities like working for wages while enrolled (Perna & Odle, 2020). The "costs" of these requirements placed on students must be carefully weighed against the "benefits" they may yield estimated from other empirical work, including by decisionmakers when considering "who pays" for these initiatives. If policymakers or institutional leaders take a purely fiscal perspective that only concerns costs they will bear, they will likely overlook significant other costs that are not only operationally required but that could, in this example, also produce counterproductive outcomes.

Considering other aspects of cost, while often necessary to function, funding student success initiatives with precarious, non-recurring resources via donations and in-kind costs (e.g., 35% of total resources for the basic needs center and 14% of resources for financial aid) could mean that the presence and intensity of an intervention can vary widely from year to year, limiting continuity of service and mediating the impact of the initiative on intended outcomes. Understanding these dynamics of total cost, cost distribution, and cost actors is crucial for fostering partnerships and leveraging resources to sustain these programs in the long-term.

Limitations

An important feature of this work is that the cost for each student success initiative generated here is necessarily based on how programs were implemented at community colleges in this sample. That is, a basic needs center, for example, designed and operated in other ways,

with other services, and targeted at other student populations may use different ingredients, which may also vary in quantity and price. When considering how ingredients, quantities, prices, and ultimate costs are identified and valued here, it is important to keep in mind that these costs may not apply to all variations of initiatives as they exist across colleges—or be equally effective at serving all student bodies. It is important to acknowledge that the open-access mission of community colleges means that the composition of each entering cohort (i.e., size, level of academic preparation, and needed supports) can shift meaningfully from one year to the next. Because the resources required to serve students depend on *who* is being served (and *how many*), per-student costs are not a fixed target. They may vary across cohorts even within the same institution, and especially across institutions and states. Decisionmakers using these estimates to forecast the cost of raising outcomes like retention and completion should treat them as informed approximations rather than precise figures—and should expect that adjustments will be necessary for the specific population a given initiative is designed to serve.

Nevertheless, this work still marks a substantial advancement in our understanding the costs of various student success initiatives—a more than doubling of published cost estimates of higher education interventions to date—and provides materials allowing for future flexible use by decisionmakers and researchers alike. Users can leverage campus information in Table 1, as well as detailed information on each initiative in the Online Appendix, to more closely understand how costs may generalize to their setting—or make necessary modifications to arrive at more accurate cost estimates for their version of a given initiative. Related to this is the fact that costs here were generated using national prices and common cost assumptions to maximize generalizability (Shand & Bowden, 2022). However, prices can vary widely across regions, thus estimates for personnel costs presented here may be artificially higher or lower than would be

experienced at a local level (e.g., state versus federal minimum wage; Levin et al., 2018). Users can again use detailed information on each initiative in the Online Appendix to generate their own costs by altering prices or assumptions as necessary.

An important consideration for this and any future work concerns the self-reported nature of ingredients data. Because program staff describe the resources their initiatives use, their accounts could bias ingredient lists in either direction—under-reporting resources they take for granted (e.g., shared personnel, donations, overhead) or over-reporting them to signal a program's value, justify its budget, or by attributing resources that would exist even without the initiative. Guided by best practices in cost estimation, several features of my data collection guard against both (Levin et al., 2018). Respondents identified ingredients and quantities, but prices were assigned independently by the research team from external databases (e.g., CUPA-HR, CBCSE's CostOut/E$timator), so estimates did not inherit any valuation from respondents. Ingredient lists were also triangulated across implementation and finance studies, public materials, interviews with multiple stakeholders per college, resource questionnaires, and a final review meeting rather than any one single account. I also applied a consistent "business-as-usual" contrast to only include resources required specifically to implement the initiative, with shared resources also explicitly partitioned to the initiative's portion alone (e.g., a director's time split across duties only captures time dedicated to the specific initiative; Bowden et al., 2020).

Potential reporting bias was also further limited where it would matter most: personnel, the largest cost category for most initiatives. Respondents were asked to report their *share* of time devoted to an initiative rather than absolute hours. Because effort shares are bounded (i.e., no one can allocate more than 100% of time), and most community college personnel support multiple programs (i.e., a larger share for one initiative implies a smaller share for another),

respondents could not inflate the *total value* of their time—only distribute it across competing responsibilities. A respondent could still misjudge the share itself, but framing time as "competing" in this way—plus triangulating across several sources and applying a business-as-usual contrast—should reduce reporting error. While no self-reported instrument fully eliminates reporting bias, these procedures can substantially limit both its scope and direction.

Cost-Effectiveness and Opportunities for Future Research

Another clear limitation of this work is its focus on cost rather than *cost-effectiveness*. Economic evaluations of cost-effectiveness identify one alternative from a set of options that maximizes outcomes and minimizes total cost (Levin et al., 2018). This "biggest-bang-for-your-buck" question is often forefront of mind among campus administrators, policymakers, and funders alike. This is achieved by comparatively assessing total resource cost relative to a selected unit of effectiveness (e.g., increasing retention rates by 1 percentage point; Shand & Bowden, 2022). While cost-effectiveness presents many advantages, it presents steep challenges—principally in requiring a comprehensive understanding of costs *and* effects (Bowden et al., 2017). While many initiatives have established or are developing causal evidence suggesting they raise students' academic performance, retention rates, and degree completion outcomes, no impact evaluations were completed *at these sites,* drawing impacts *from these programs*. Pairing costs generated at these sites with causal evidence from other sites presents a mismatch problem: costs and effects drawn from different populations (Hollands et al., 2016). An ideal setting pairs an impact evaluation with a cost analysis, ensuring that costs and effects were both generated from the same program and population, allowing the researcher to ensure that those specific ingredients (by level, quantity, quality, and implementation) produced those specific effects. It is not clear that resources captured in this study would produce effects

equivalent to those estimated in other settings (that necessarily used other ingredients and quantities). Also, while costs were consistently estimated across these initiatives in this study, to my knowledge, there is no single outcome used across impact evaluations of causal works on these initiatives (i.e., some measure impacts on GPA while others measure impacts on retention, which may *also* be measured differently: fall-to-spring versus year-to-year). This precludes generation of a true cost-effectiveness ratio.

Nevertheless, the question of cost-effectiveness is of course central to how policymakers, institutional leaders, and funders alike weigh these initiatives and consider the investment of their marginal dollar: Which will yield the biggest "bang" for their buck? To provide a possible indication while respecting the limits described above, the Online Appendix conducts an illustrative benchmarking exercise that pairs each initiative's per-student cost from this study with the best-matched causal evidence from the available literature on the most common outcome measured across similar interventions: retention. I follow Levin et al.'s (2018) cost-effectiveness computation to estimate a cost per additional retained student for each initiative. Because effects are necessarily drawn from other programs and populations, are measured over differing horizons and under different identification strategies, and, in two cases, have not been credibly estimated on retention at all, the resulting figures are *not* a cost-effectiveness ranking of these initiatives and should not be interpreted as one. They can, to some degree, provide decisionmakers with a loose sense of the types of costs and possible related effects these initiatives may produce. This is certainly an important opportunity for future work.

More higher education researchers should also widen their gaze beyond identifying what "works" to also pay careful attention to program implementation and cost (Levin et al., 2018). Only after building a robust collection of comparable costs and effects can we truly establish a

body of evidence that facilitates informed choice by campus leaders, policymakers, and foundation partners. There is detailed guidance on embedding cost analyses into impact evaluations (Bowden, 2023), and the SEER standards compel researchers to begin analyzing intervention costs in service of scaling of promising interventions (IES, 2022). Looking more narrowly to community college student success interventions, future research may conduct impact evaluations of these programs and use these existing cost estimates in a true cost-effectiveness framework. Likewise, prior impact evaluations of similar interventions as cited could revisit sites to collect information on implementation and ingredients for a valid cost-effectiveness analysis. Additional work could also focus on understanding how program efficacy changes with resource modifications—on both the intensive and extensive margin.

Beyond cost-effectiveness, this work speaks to the cost and cost-feasibility of these common community college student success initiatives but not to their allocative efficiency—namely, whether the resources they require crowd-out other uses that could produce a greater social return if used in another way. Benefit-cost scholars (even those in education) often frame efficiency in these terms, asking not only what a program costs but what its resources would otherwise accomplish (Adams & Clemmons, 2006; Levin et al., 1976; Levin et al., 2018). The initiatives here are, in effect, compared against one another, but a fuller treatment would also compare them against alternative uses (and benefits) of the same funds, such as providing colleges with more operating dollars (Deming & Walters, 2017), expanding merit- or need-based financial aid (Nguyen et al., 2019), or making investments outside of higher education altogether (e.g., making cash transfers or investing in early childhood education, housing, or health). The social-cost accounting perspective taken here is useful for such comparisons given that it captures the full set of resources each initiative consumes regardless of who bears the cost. What

it does not provide are the *benefits* of these programs—or of their alternatives—needed to complete the comparison. This, too, is an important opportunity for future work and an important consideration of tradeoffs for policymakers eyeing allocative efficiency. It is possible that, while each of these initiatives may be linked to higher student outcomes, the social benefit of a marginal dollar would be better spent on other alternatives.

A further consideration for scaling concerns the distinction between fixed and variable costs. The per-student figures reported here are average costs—total cost divided by the number of students who actually received each intervention (Shand & Bowden, 2022). Average cost combines the fixed costs of establishing and maintaining a program (e.g., dedicated positions, facilities, technology/licenses) with variable costs of serving each additional student (e.g., food and supplies, tutoring hours, extra emergency grant). These structures differ markedly across the six initiatives here. Some are fixed-cost intensive: Early Alert is 82% personnel (Table 3), relying on staff coordination and technology whose costs change little as more students are flagged. Its average cost would fall substantially with scale. Others are variable-cost intensive: Emergency Aid is 89% materials and cash transfers, so its average cost stays relatively flat with enrollment growth, with each additional recipient adding to the numerator (cost) and denominator (students served). Because the *marginal* cost of serving one additional student can diverge from the *average* cost in fixed-cost-intensive programs, decisionmakers weighing expansion should carefully consider which structure their given initiative reflects. After identifying which ingredients are fixed and which are marginal, the Online Appendix can allow users to explore which inputs might scale with enrollment and which might not, though a formal decomposition of fixed and marginal costs—ideally observed across varying enrollment levels—remains an important direction for future work. In all, future research should ultimately explore

the intersection of cost and impact more deeply and work to coherently develop a body of evidence that allows for comparisons of programs' costs and effects.

Finally, and closely related, the estimates here represent a snapshot of each initiative at a particular point in time, and per-student costs are unlikely to remain static as programs mature. A long tradition in organizational theory holds that costs tend to fall as organizations accumulate experience. This is also referred to as organizational learning—a concept whereby efficiencies can be gained from "learning by doing" (Arrow, 1962)—and learning can occur from an organization's own work (i.e., colleges becoming more efficient over time delivering these very interventions) or others' (i.e., one college taking and implementing "best practices" from another college). Applying such logic to these student success initiatives suggests that organizational learning, accumulated implementation experience, and "economies of scale" can all reduce costs over time. One salient example is the successful replication of CUNY ASAP across three (other) community colleges in Ohio, where Miller et al. (2020) found that a "less expensive" version of the program produced similar effects but at a substantially lower cost per degree. In all, the single-year estimates provided here cannot capture this trajectory or extrapolate to other settings (and other program design choices), but decisionmakers should acknowledge that the *startup* costs of an initiative may differ from its years-later *operating* costs. Tracking the same program over time would be one way to learn how (and how quickly) costs evolve with learning.

Implications for Policy and Practice

With comprehensive information on the ingredients, total cost, and distribution of resources required to make many community college student success interventions "work," decisionmakers can leverage this information to identify what programs are possible to achieve their goals (and to what level) within a given budget. These estimates and information on each

individual initiative can be translated from a national scale to a state, community, or single-institution perspective—moving conversations from "we should do this" to "this is *how* we can do it" and "this is what it will cost"—as they not only decide on an initiative to pursue but also design it in ways to meet the specific needs of their student population. As this work moves forward, the social nature of the Ingredients Method has also made explicit the total resources actually required to implement and operate the initiatives in question. For example, a policymaker or campus might estimate costs to operate an embedded tutoring program as the annual costs of tutors. This would grossly undercount resources truly required of the initiative, which does include personnel but also importantly includes training, facilities, materials, and induced student time.

Four institutions provided program-level budgets for their student success initiatives, and Table 4 compares these campus budget estimates to the total estimated annual cost of each intervention to the college. Even with an "apples-to-apples" comparison (removing induced costs to students and in-kind costs borne by society), colleges still consistently and uniformly underestimated costs. As noted, budgets often undercount costs because they report resource *allocation* rather than resource *use*, fail to capture resources shared across programs, typically do not consider facilities, and rarely amortize capital like technology (Hollands et al., 2016; Levin & McEwan, 2001). Budgets can thus distort the true "cost" of a program and are not preferred in place of comprehensive cost estimates (Shand & Bowden, 2022). Table 4 shows that campus budgets only captured 23-87% of true expected costs and are underestimated by roughly $150-880 *per student* annually. These differences are predominantly driven by (a) budgets that did not account for shared program staff essential for operations [i.e., most captured full or partial costs for program coordinators but did not capture necessary time for area directors/deans,

administrative staff, and others], (b) budgeting that did not include the full cost of personnel [e.g., all lacked fringe-benefit costs, roughly 38.1% in the public sector], (c) personnel accounting that treated "general fund" staff paid on a college's budget differently than personnel paid on grants or contracts, and (d) budgets that failed to account for facilities, technology, and shared materials/supplies. This underscores the importance of campus leaders and policymakers alike using more comprehensive figures when making decisions regarding funding and resource allocation rather than common budget-based estimates. While budget figures could be generated in a more comprehensive fashion, existing models and practices yield estimates that consistently understate the true costs to operate a given program. This may lead institutional leaders to *request* (and policymakers or funders to *provide*) fewer resources than necessary. Such decisions may produce suboptimal investments that fail to fully replicate these programs, yield fewer positive impacts, and further constrain community colleges' existing resources.

Another key implication of this work is the clear need for policymakers, campus leaders, and funders to move beyond a one-size-fits-all approach when evaluating program affordability and impact. Context-specific factors, such as institutional capacity, student demographics, and the availability of new and existing resources (from state, local, or other actors), must be carefully considered to ensure programs are both effective and sustainable. "Who pays" is clearly an important consideration when deciding between community college student success initiatives, but such a question requires a first-order, clear and comprehensive understanding of *what* they are paying for—and *how much*. This work takes an important step in answering those questions for immediate use by decisionmakers as they design and/or scale their own programs while also building a strong foundation for future work.

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Table 1. *Summary of student success initiatives and community colleges.*

Student Success Intervention	Basic Needs Center	College/Career Success Course	Early Alert	Embedded Tutoring	Emergency Financial Aid	First/Second-Year Experience
Description	Provides students with food, clothing, and supplies plus grants for childcare, transportation, and emergency issues. Also connects students to community-based programs and services, including application assistance.	Required 1-credit college success/career course. Emphasis placed on life skills, career and transfer preparation, and goal-setting through lecture/lab activities. Students engage with specially trained instructors and peer mentors. Hybrid and online.	Dedicated staff undertake coordinated outreach to identified students across multiple means, provide direct intervention and follow-up, and connect students to on- and off-campus resources as necessary.	Places trained peer and professional tutors in over 100 gateway and "high fail" courses to provide in- and out-of-class support, including weekly review sessions and one-on-one tutoring.	Targeted and just-in-time awards used to cover students' semester or summer tuition, as well as books and supplies. Incentive grants also provided for students to re-enroll and return in subsequent semesters.	Cohort-style program with holistic supports, including priority registration, personal coaching, academic and career advising, peer mentoring, specialized programming, and access to dedicated Student Success Center space.
Students Served Annually	1,500	3,160	140	1,990	270	560
Community College Context						
Total Enrollment	8,140	9,220	17,410	8,110	3,010	14,090
Operating Expenses ($1m)	$40m	$60m	$190m	$70m	$10m	$50m
% Black and Hispanic	60%	55%	30%	90%	10%	45%
% Pell	55%	60%	60%	80%	55%	30%
150% Graduation Rate	20%	30%	30%	45%	20%	40%
State	Texas	Texas	Ohio	California	Ohio	California

Sources: CCRC; US Department of Education (College Navigator and IPEDS).

Notes: College figures for 2022-23 academic year. Students served, college enrollment, and expenses rounded to nearest 10; all other rounded to nearest 5. Expenses are on core activities: instruction, academic support, and student services.

Table 2. *Total present value of core costs, costs per student, and distribution of costs.*

Total Cost	**Basic Needs Center**	**College/Career Success Course**	**Early Alert**	**Embedded Tutoring**	**Emergency Financial Aid**	**First/Second-Year Experience**
Total Cost	$1,067,500	$2,900,200	$79,900	$2,480,500	$357,500	$671,200
Cost per Student						
Students Served Annually	1,500	3,160	140	1,990	270	560
Cost per Student	$712	$918	$571	$1,246	$1,324	$1,199
Distribution of Costs ($ and % of total)						
Personnel	$388,200 (36%)	$1,685,500 (58%)	$62,500 (82%)	$1,928,800 (78%)	$40,600 (11%)	$542,500 (81%)
Training	$0 (0%)	$2,900 (<1%)	$0 (0%)	$135,800 (6%)	$0 (0%)	$0 (0%)
Facilities	$96,700 (9%)	$62,800 (2%)	$5,700 (7%)	$402,500 (16%)	$600 (<1%)	$113,000 (17%)
Materials and Supplies	$582,600 (55%)	$141,500 (5%)	$9,000 (11%)	$13,400 (<1%)	$316,300 (89%)	$15,700 (2%)
Other	$0 (0%)	$1,007,500 (35%)	$0 (0%)	$0 (0%)	$0 (0%)	$0 (0%)

Sources: CCRC.

Notes: Dollars are CPI-adjusted $2024 USD. Figures rounded, so dollars or percentages may not perfectly sum. Personnel captures staff, students, and others associated with initiative. Training captures specialized professional development required for operation. Facilities capture required space associated with initiative, including office/classroom furnishings. Materials and Supplies capture all required resources for initiative, including any technology/licenses. Other captures miscellaneous but necessary expenditures. Expenditures for each initiative are fully explained in text.

Table 3. *Total present value of core costs (gross) and cost burden.*

Cost Burden	Cost to College (Direct)	Cost to Students (Induced)	Cost to Society (In-Kind)	Total Cost
Initiative				
Basic Needs Center	$699,200 (65%)	$0 (0%)	$368,300 (35%)	$1,067,500
College/Career Success Course	$885,300 (31%)	$2,014,900 (69%)	$0 (0%)	$2,900,200
Early Alert	$79,600 (99%)	$300 (1%)	$0 (0%)	$79,900
Embedded Tutoring	$2,271,700 (92%)	$208,800 (8%)	$0 (0%)	$2,480,500
Emergency Financial Aid	$305,600 (85%)	$2,200 (1%)	$49,700 (14%)	$357,500
First/Second-Year Experience	$654,900 (98%)	$16,300 (2%)	$0 (0%)	$671,200

Sources: CCRC.

Notes: Dollars are CPI-adjusted $2024 USD. Figures rounded, so dollars or percentages may not perfectly sum. Costs to college are directly paid by institution. Costs to students are charged (e.g., tuition) or induced (e.g., time spent out of coursework or not working). Costs to society are provided in-kind, typically from donations or public goods and services (e.g., food pantry). Expenditures for each initiative are fully explained in text. The table reports total (gross) costs by actor, not net costs. Tuition, for exmple, is reported as a Cost to Students and contributes to Total Cost on that basis. Because the same dollars are also revenue to the institution, an institutional (or "fiscal") perspective can net them against the direct Cost to College. For the College/Career Success Course, this implies a net *gain* to the institution of roughly $122,200. See pp. 27-28 for a full discussion and the Online Appendix for a more detailed accounting.

Table 4. *Estimated present value of core costs (overall and by category) to college compared to college budget estimates (annual), selected.*

Total Cost	**Basic Needs Center**		**Embedded Tutoring**		**Emergency Financial Aid**		**First/Second-Year Experience**	
	Estimated PV Cost to College	*College Budget*	*Estimated PV Cost to College*	*College Budget*	*Estimated PV Cost to College*	*College Budget*	*Estimated PV Cost to College*	*College Budget*
Total Cost	$699,200	$356,800	$2,271,700	$530,000	$305,600	$265,700	$654,900	$205,500
Distribution of Costs								
Personnel	$388,200	$110,300	$1,720,000	$525,400	$38,400	$10,000	$526,200	$200,500
Training	$0	$3,000	$135,800	$600	$0	$0	$0	$0
Facilities	$96,700	$0	$402,500	$0	$600	$0	$113,000	$0
Materials and Supplies	$214,300	$243,500	$13,400	$4,000	$266,600	$255,700	$15,700	$5,000
Variance ($ and % of PV)	-$324,400 (51%)		-$1,741,700 (23%)		-$39,900 (87%)		-$449,400 (31%)	
Variance per Student ($)	-$230		-$880		-$150		-$800	

Sources: CCRC.

Notes: Dollars are CPI-adjusted $2024 USD. Figures rounded, so dollars may not perfectly sum. Personnel captures staff, students, and others associated with initiative. Training captures specialized professional development required for operation. Facilities capture required space associated with initiative, including office/classroom furnishings. Materials and Supplies capture all required resources for initiative, including any technology/licenses. Expenditures for each initiative are fully explained in text. Present value calculated using Ingredients Method as described in text and in Online Appendix and reduced to only costs to college (Table 3). College budget estimates provided by respective institution. (Research team could not secure campus budgets for the college/career success course or early alert initiatives.) Variance represents total difference between estimate and budget; % reflects the budget's share of total estimated cost to college; and variance per student is total difference divided by number of students served.

ONLINE APPENDIX

Cost Worksheets

Summary tables, complete ingredient lists for each initiative, and a master price sheet with sources and all cost transformations are available at: https://tinyurl.com/CC-Cost-Studies-Appendix. Users can fully replicate the existing analysis and leverage campus information in Table 1, as well as detailed information on each initiative in Online Appendix, to more closely understand how costs may generalize to their setting or make necessary modifications to arrive at more accurate cost estimates for their version of a given initiative. Possible use cases include alternating between local and national prices (e.g., federal versus state minimum wage), varying the scale of an initiative (i.e., for a larger or smaller student body), or imposing alternative assumptions (e.g., resources to be provided in-kind versus purchased or amortizing/discounting use over different time horizon).

Illustrative Cost-Effectiveness Benchmarking

Cost estimates in this study describe all social resources required to operate an initiative but do not indicate how efficiently each may convert those resources into improved student outcomes in a cost-effectiveness framework. As discussed in the main text, a true cost-effectiveness analysis is not yet possible here because no impact evaluation was conducted *at these sites* that would allow a clear comparison of costs and effects. Instead, this appendix offers an *illustrative* benchmark to give policymakers, institutional leaders, and funders a pairing of these costs with *possible* related effects of these initiatives. Following the cost-effectiveness method described by Levin et al. (2018), I pair each initiative's per-student cost with a best-matched causal estimate of its effect on retention to express a "cost per additional retained student." For example, if a program raises retention by 3 percentage points, then, for every 100

students it serves, it keeps roughly 3 students enrolled who would have left otherwise. The cost of serving those 100 students, divided by those 3 additional retained students, is the cost per additional retained student. Equivalently, this is simply the per-student cost divided by the retention effect expressed as a proportion (the percentage-point change in retention rates). See Levin et al., 2018 for a complete discussion. I selected retention because it is the most common outcome available across causal studies of these programs. Results appear in Table A1.

Again, estimates in Table A1 should be read as illustrative only. The resources "costed-out" here and their paired effects come from different programs, populations, and settings, so the condition under which a cost-effectiveness ratio is interpretable—that resource estimates are those that generated the same measured effect (Levin et al., 2018)—is not met. This is the very "mismatch problem" Hollands et al. (2016) describe. The effects do not share a common outcome, horizon, or design. Even by using retention as a common outcome denominator, measurements from existing studies vary widely (e.g., session-to-session enrollment, fall-to-spring retention versus year-to-year, retention at second or third year), and, for two initiatives, even an illustrative example cannot be computed because the best-matched evidence either showed zero effect (which would require dividing costs by zero, leaving a cost-effectiveness ratio undefined) or only measured outcomes other than retention. Where figures could be computed, it is important to highlight that they vary by roughly an order of magnitude—from about $7,400 to more than $41,000 per additional retained student or further if undefined.

Reviewing estimates that could be defined in Table A1, the Basic Needs Center and the College/Career Success Course sit at the low end of cost-efficiency at roughly $7,400-23,000 and $9,200-14,600 per additional retained student, respectively. These are followed by the First/Second-Year Experience program, which costs roughly $12,200-15,600 to produce an

additional retained student. Emergency Financial Aid sits dramatically higher—from roughly $41,000 per additional student under the most favorable matched effect estimate to an undefined required investment (the most rigorous and best-matched trials detected no statistically significant effect on retention). The remaining two initiatives cannot be placed on this metric: Early Alert because its best-matched randomized trial likewise found no significant effect on retention, and Embedded Tutoring because its best-matched evidence only measured course completion rather than retention. No initiative stands out as most cost-effective. Notably, this ordering also does not track the ranking of these same initiatives by per-student cost in Table 2. There, Early Alert is among the least expensive initiatives to operate, yet it yields no computable cost-per-retained student, while the Basic Needs Center is similarly inexpensive but appears among the most favorable on this illustrative metric at raising outcomes in a cost-effective way. The wide spread of these ranges, and the fact that two of the six initiatives could not even be descriptively considered at all, again urges caution in their interpretation—even when confined to a single common outcome and each initiative's best-matched causal evidence. This reality is consistent with Levin et al.'s (2018) own cautions that cost-effectiveness comparisons are valid only across programs of similar scale, population, and time period, and that ratios drawn from heterogeneous evidence often exhibit ranges too wide to be regarded with confidence.

Even considering these important limitations, this exercise may still provide some useful insights. Policymakers, institutional leaders, and funders considering an investment in one of these initiatives can use these figures to develop a rough, order-of-magnitude sense of the resources that producing an additional retained student might require. In tandem, they must also recognize that a program's operating *cost* alone is not a sufficient indication of its possible *cost effectiveness*. The figures here are most defensibly read within a single row rather than across

them: Consider the cost of each initiative alongside the plausible range of effects from its matched study (also directly referenced in Table A1). If an initiative's effect is not significant or is undefined, it is not necessarily true that a similar program will be ineffective; only that the evidence needed to judge its cost-effectiveness on this outcome does not exist yet. In all, these figures should inform questions rather than decisions. Decisionmakers considering a given initiative could ask what a rigorous, on-site evaluation paired with a cost analysis might show. Generating that evidence, ideally by pairing ingredients-based cost analysis with rigorous impact evaluation of the same programs, remains an important opportunity for future work.

Appendix Table 1. *Illustrative cost-effectiveness estimates: Estimated costs and possible effects on retention drawn from related literature.*

Initiative	Cost per Student	Possible Effect on Retention (pp)	Estimated Outcome and Time Horizon	Source(s)	Illustrative Range of Cost per Additional Retained Student
Basic Needs Center	$712	+3.1 - 9.6	Retention, 1-3 years	*WWC (2020); Daugherty et al. (2016); Zhu et al. (2018)*	$7,400 - 23,000
College/Career Success Course	$918	+ 6.3 - 10.0	Retention to 2nd year	*Cho & Karp (2013)*	$9,200 - 14,600
Early Alert	$571	No sig. effect	Retention, fall-spring	*Mayer et al. (2019)*	-
Embedded Tutoring	$1,246	-	-	*Tucker et al. (2020)*	-
Emergency Financial Aid	$1,324	0.0 - 3.2	Retention, year-year	*Evans et al. (2019); Goldrick-Rab et al. (2022); Nguyen et al. (2019)*	$41,000 - Undefined
First/Second-Year Experience	$1,199	+7.7 - 9.8	Retention, 2-4 terms	*Scrivener & Weiss (2013)*	$12,200 - 15,600

Sources: CCRC.

Notes: Cost per Student are $2024 dollars from Table 2. This illustrative table shows possible cost per additional student retained for each initiative following the cost-effectiveness method described by Levin et al. (2018). Per-student costs are divided by a program's possible effect on retention (expressed as a percentage point/portion of 100), yielding the resources required to retain one additional student (or, equivalently, one additional retained student per N students served). Ranges of possible effects reflect either alternative specifications within a single study (e.g., Cho & Karp's first-semester vs. first-15-credit enrollment estimates) or alternative best-matched estimates drawn from the causal/quasi-experimental literature on similarly scoped initiatives (e.g., for aid, the meta-analytic estimate for aid paired with supports at one bound and the null effects of two randomized trials at the other). Retention effects have not been rigorously measured for Embedded Tutoring. Cost-effectiveness estimates cannot be generated without a defined effect, so Early Alert and Embedded Tutoring are undefined, as is the possible range for Emergency Financial Aid (division by zero). Effects are not drawn from the same cost-out initiatives or from a common outcome measure, population, time horizon, or study design, thus the table is not a cost-effectiveness ranking and should not be interpreted as such. It is for illustrative purposes only. See discussion beginning on p. 34 for more detail.