The Four-Tier Continuum of Academic and Behavioral Support (4T-CABS) Model

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The Four-Tier Continuum of Academic and Behavioral Support (4T-CABS) Model: An Integrated Model for Medical Student Success

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Abstract

Not all students cope successfully with the demands of medical school, and students' struggles may result in study delay or dropout. To prevent these outcomes, medical schools need to identify students who are experiencing academic difficulties and provide them with timely interventions through access to support programs. Although the importance of early identification and intervention is well recognized, less is known about successful strategies for identifying and supporting struggling students.

Building on the literature and their own empirical findings, the authors propose an integrated, school-wide model for medical student success comprising a continuum of academic and behavioral support. This Four-Tier Continuum of Academic and Behavioral Support (4T-CABS) model focuses on improving both academic and behavioral outcomes by offering support for students at four levels, which range from adequate instruction for all, to targeted small-group interventions, to individualized support, and also include exit support for students who might be better off in another degree program.

Additionally, medical schools should provide both academic and behavioral support; set high, yet realistic expectations and clearly communicate these to students; and intervene early, which requires timely identification of at-risk students who would benefit from the different types and tiers of support. Finally, interventions should be evidence based and fit the needs of the identified groups of students. The authors argue that adopting the core principles of the 4T-CABS model will enable medical schools to maximize academic engagement and performance for all students.

Although I stand by the statement that the health professions attract some of the best and brightest students society has to offer, I feel equally confident stating that one of the professions' dirty little secrets is that there are students among them who struggle mightily to learn the material and often graduate without the skill or knowledge that should define them as being prepared for the next level of training.

—Kevin W. Eva[1]

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This recent statement highlights one of the dilemmas medical educators face: Medical students in general are talented and highly motivated, but some of them struggle. Eva[1] suggests that these struggling students "probably account for the greatest challenges faced by educators and may require more attention than all the other students combined." If medical schools neglect to address their struggling, these students will probably not become doctors, or, worse, they will fail to become good doctors. In this Perspective, we describe how implementing a continuum of academic and behavioral support might enable medical schools to maximize academic engagement and performance for all students.

The large investments made by both student and society in medical training, combined with the competitiveness of the selection process, justify efforts to reduce dropout rates and study delay in medical school even though the dropout rates of medical students are generally much lower than those of students in other university programs.[2–4] To reduce study delay and dropouts, medical schools need to identify students experiencing academic difficulties at an early stage and provide those identified as "at risk" with timely interventions, such as access to support programs, or referral to another degree program when appropriate. Nevertheless, even though the importance of early identification and intervention is well recognized, little is known about successful strategies for identifying and supporting struggling medical students.[4–8]

A successful strategy for reducing delay and dropout is more complicated than simply detecting the worst-performing students and offering them study skills training.[9] The most important question to consider is, "Which students are most likely to benefit from support?" as not all poor-performing students are willing or able to benefit. Building on the literature and our own research, we propose a systematic, integrated model for medical student support and success: the Four-Tier Continuum of Academic and Behavioral Support (4T-CABS) (Figure 1). This model for student support was inspired by the Positive Behavioral Interventions and Supports (PBIS) framework,[10,11] a schoolwide approach that has shown positive effects at primary and secondary schools in the United States and Norway and is increasingly being implemented in schools in The Netherlands. To our knowledge, we are the first to adapt the PBIS framework to the context of higher education.
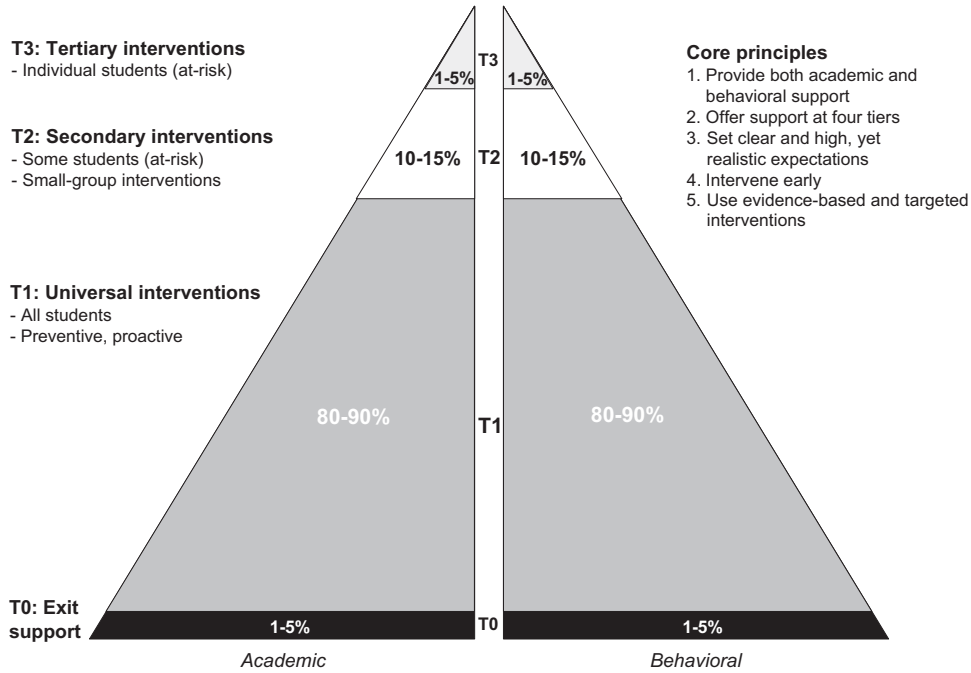
Continuum of Academic and Behavioral Support

Figure 1 The Four-Tier Continuum of Academic and Behavioral Support (4T-CABS) model for integrated, schoolwide medical student support and success. Percentages in the figure indicate percentages of students expected to need support in a particular tier. Tier 0 (T0) is exit support offered to help students in making the decision to withdraw and to refer them to another degree program; Tier 0 interventions can occur at any point in the continuum but ideally should take place as early as possible. Tier 1 (T1) represents universal interventions which are offered to all students and are considered preventive and proactive. Tier 2 (T2) represents secondary, small-group interventions for at-risk students. Tier 3 (T3) represents tertiary, individualized interventions for specific students.

Core Principles of the 4T-CABS Model

There are five core principles of the 4T-CABS model:

1. *Provide both academic and behavioral support*: Support should focus on improving both academic and behavioral outcomes of students.

2. *Offer support at four tiers*: Support should be offered at different levels, ranging from adequate instruction for all students, to various targeted small-group interventions, to individualized support. The levels should also include exit support for students who might be better off in a different degree program.

3. *Set clear and high, yet realistic expectations*: Medical schools should set high, yet realistic expectations and clearly communicate these to their students.

4. *Intervene early*: Medical schools should facilitate timely identification of at-risk students who would benefit from the different types and tiers of support.

5. *Use evidence-based and targeted interventions*: Support offered should be evidence based and fit the needs of the different identified groups.

Below, we will describe each of these core principles in more detail.

Provide Both Academic and Behavioral Support

The first core principle of the 4T-CABS model is that medical schools should offer two types of support—academic and behavioral—to prepare their students for the next level of training. Although the tendency is to focus attention on academic support, recent research suggests that it is not a luxury to also pay attention to the behavior of medical students. Not only has early academic performance been shown to be a predictor of later performance,[12–16] but also aspects of students' behavior have been found to be related to being at risk of failure at medical school.

For example, we showed that participation in exams,[14,17] in scheduled learning activities,[18] and in offered support[9,19]

was associated with medical school performance. Nonparticipation in these areas could be seen as a form of unprofessional behavior. Professional behavior, or professionalism, is increasingly considered important for both medical students and practicing doctors.[20,21] Others have reported that unprofessional behavior while a student may be associated with poorer performance in medical school[22,23] and even with deficiencies in later professional life.[24] In addition to poor attendance, examples of unprofessional student behavior are inappropriate conduct toward others and lack of commitment, as well as behaviors related to practical issues such as failure to organize internships or to complete hepatitis B vaccination schedules on time.[25] Given the importance of professionalism, medical schools should no longer only focus their support on improving students' academic outcomes but, rather, extend their support to include behavioral outcomes.

Offer Support at Four Tiers

The second core principle of the 4T-CABS model is that support should be offered at four levels or tiers (see

Figure 1). The nature and intensity of the support offered at each tier must be differentiated to help all students achieve high rates of success.

Tier 1 interventions are universal; they are provided to all students to prevent academic and behavioral problems. It is expected, on the basis of experiences with PBIS,[11] that 80% to 90% of students respond to Tier 1 interventions. Tier 2 interventions are secondary, specially designed small-group interventions for at-risk students. On the basis of experiences with PBIS,[11] we expect that about 10% to 15% of students need Tier 2 interventions to become more successful at medical school. Tier 3, tertiary interventions are individualized and tailored to meet the needs of individual at-risk students. We estimate that 1% to 5% of students require Tier 3 interventions. Tier 0 consists of "exit" support for students who might be better off in another degree program. We added this fourth tier to the original PBIS continuum on the basis of the findings of our own research on at-risk medical students.[9,17,19] We estimate that 1% to 5% of students need exit support.

Tier 1: Universal interventions

Initially, Tier 1 academic interventions are needed to ease the transition to undergraduate medical education from secondary education (e.g., in The Netherlands) or university education (e.g., in the United States). An example is the provision of "learning to learn" courses for first-year medical students to help them identify their self-regulated learning approach at an early stage and to enable them to make changes to reduce their chances of future underperformance.[26] Tier 1 academic interventions also include the use of evidence-based educational practices, such as encouraging participation and strengthening self-efficacy: We recently showed that higher levels of participation and self-efficacy are positively associated with medical student performance.[18]

Tier 1 behavioral interventions establish and teach all students how to display expected behaviors and acknowledge students for exhibiting expected behaviors.[11] First, medical schools should determine and communicate uniform behavioral expectations for their students. Second, they should set up sensitive

methods for detecting unprofessional behavior and clear strategies for dealing with it.[27,28] At the Erasmus MC medical school, we recently implemented a program for longitudinal assessment of professional behavior that provides students with feedback, so they can reflect on their professional behavior and improve it where necessary. It also allows early detection of students who show unprofessional behavior or attitudes.

Tier 2: Small-group interventions

Examples of secondary or Tier 2 academic small-group interventions include a mandatory cognitive skills program for at-risk medical students[29] and a short integrated study skills program.[9] Both of these interventions have shown promising results in the short term[9] or over the long term[29] and have led to suggestions for improving future efforts[9,29]; empirical verification of these suggestions is still required. A very different example is an honors class for excellent students, as is offered at several Dutch medical schools. Although these students are not at risk of failing, they are at risk of not reaching their full potential because the core medical curriculum does not sufficiently challenge them.

Tier 2 behavioral interventions include specially designed small-group counseling interventions, such as communication skills training, assertiveness training, or training in tackling procrastination.

Tier 3: Individualized interventions

Tertiary or Tier 3 interventions may be required for students with intensive academic and/or behavioral problems, as well as for students who combine medical school with a professional career (e.g., sports, music) or are members of a student board (e.g., medical student union, faculty council[30]). One example of a Tier 3 academic intervention is the offer of additional individual skills lab sessions for students who are struggling with anatomy. Another is the use of the Self-Regulated Learning–Microanalytic Assessment and Training framework proposed by Durning et al,[31] which specifically aims to improve individual trainee self-regulatory beliefs and behaviors.

Tier 3 behavioral interventions include individualized intervention plans designed to meet the needs of students who exhibit chronic problematic behaviors. Examples include a "time out"

period (e.g., a leave of absence) and/or help from medical professionals.[25]

Tier 0: Exit support

For some students, withdrawing from medical school may be the best option, but this is often a tough decision for them to make. Exit support should therefore focus on assisting them with the decision and providing them with realistic alternatives. Tier 0 interventions can take place at any point along the continuum, but preferably as early as possible, in the interest of both the medical school and the student.

Set Clear and High, Yet Realistic Expectations

The third core principle of the 4T-CABS model is to set (realistically) high academic and behavioral expectations and to communicate these expectations to students. There is a strong relationship between expectations and academic achievement: Research has shown that students need high academic expectations, for themselves and/ or from others, to reach high levels of achievement.[32] However, academic pressure and workload have been reported to contribute to the generally high level of psychological stress among medical students.[33] Ideally, to prevent undesired levels of stress, high yet realistic academic standards should be established using empirical data on what is attainable.[32] Finally, the expectations should be clearly communicated to students, who need to know what is expected from them, academically and behaviorally. Knowing what is expected can be seen as a prerequisite for commitment and engagement.

The Academic Advancement Program (AAP) at the University of California, Los Angeles (UCLA) provides an example of the effect of setting high standards and expectations for students.[34] This program, created in 1971 to widen historically underrepresented students' access to the university, started as a remediation model characterized by low expectations for the participants. In 1986, however, the AAP moved to a "philosophy of high expectations and excellence"[34(p2)] grounded in the belief that all university students possess the intrinsic qualities and aspirations to succeed. The program explicitly relies on students' strengths, abilities, and potential and creates a

culture that stimulates all students to excel. This change in approach has resulted in steadily increasing graduation rates for AAP students, and the gap in graduation rates between AAP students and UCLA students overall recently closed. The success is explained by the fact that the AAP is not a targeted approach—which would be stigmatizing—but, rather, an inclusive policy for all students.[34]

The importance of communicating the right expectations is supported by our research on the implementation of an academic dismissal policy at Erasmus MC medical school in 2005.[19] The aim of this policy was to enforce satisfactory progress by setting a minimum standard of achieving 40 of the expected 60 first-year credits by the end of the first year to prevent academic dismissal. Unfortunately, this intuitively appealing policy failed to show the anticipated positive effects on students' progress: It did not lead to earlier dropout of at-risk students, higher completion rates, or an improved study rate during the first two years of medical school (i.e., the proportion of students who obtained all 60 first-year credits within 12 months/all 120 first- and second-year credits within 24 months).[19] A possible explanation is that the wrong expectations were communicated to students—the policy focused on minimum standards rather than on the benefits of an optimal study rate. Implicitly, the message for first-year students was that 40 credits were sufficient. As a result, students may have set the required 40 credits as their personal goal. Because failing an exam no longer had any clear consequences, other student activities may have taken precedence over test preparation.[35]

Therefore, Erasmus MC medical school decided to set higher expectations for students and to raise the standards to a level at which the minimum equals the maximum.[36] Put differently, since September 2014, students have been expected to obtain all 60 first-year credits within one year. If they fail to do so, they are academically dismissed. It should be noted, however, that some compensation between exams is allowed (i.e., students may have up to two exam grades below pass level [5.5 on a scale of 1–10] if their mean grade for all exams is above 6.0), and dispensation is granted to students affected by temporary personal

circumstances. Preliminary internal data suggest that these higher expectations and clear consequences have led to an improved study rate. An alternative would be not to dismiss students who fail to meet the 60-credits standard but, rather, to let them repeat the year, as is common, for example, in U.S. medical schools and Dutch pre-university education.[29,37] In both cases, there are clear consequences for students who are not staying on track. Expectations are that such clear and high, yet realistic goals lead to improved academic performance.

Intervene Early

The fourth core principle of the 4T-CABS model is to intervene early, which requires the timely identification of at-risk students who will benefit from the different types and tiers of support. Although it would be possible to label students as at risk based on their preadmission characteristics (e.g., low entry qualifications[3]), like others,[6,29,38] we prefer to offer support to students who have experienced failure in medical school. Our reasons for this are the difficulty of predicting failure, the risk of labeling students incorrectly, and the necessity for students to admit they need support before it can be effective. Recently, we showed that adding data on early performance at medical school to a model to predict on-time completion of the first year that only included preadmission characteristic data increased the explained variance from 20% to 62%.[14]

A first step in the identification of at-risk students is to distinguish early in the first year between struggling students who are willing and able to be remediated and struggling students who would be better off in another degree program. To determine for which students an early withdrawal (after the first semester) seems the most logical choice,* medical schools should—according to published evidence—extend data on study progress with data on preadmission characteristics,[17,39] participation in exams

*Currently, the Dutch Higher Education Act (version 2017; article 7.8b) prohibits the dismissal of students before the end of the first year. However, it is questionable whether this is in the best interest of both the medical school and the student. Perhaps changing this to "not later than at the end of the first year" would be more in line with good educational practice.

and scheduled learning activities,[14,17,18] motivational beliefs and learning strategies,[18] and acceptance of support[9,19] as well as with written remarks about poor attitudes or behaviors.[25] Ideally, these data would be automatically recorded in a centralized database. Future studies are needed to confirm whether a prediction model that integrates these factors aids in identifying at-risk students and enables the early distinction between those eligible for support and those eligible for referral.

A prerequisite for making such an early distinction is that sufficient data have been collected during the first months to assess a student's capability to finish medical school. Therefore, we recommend that medical schools regularly assess students' performance during the first semester, preferably at least once a month. A recent study showed that student performance on an exam as early as two weeks into medical school was strongly predictive of later difficulty, especially in combination with attendance at small-group support sessions offered during the first semester.[15] To give students the opportunity to improve their progress, it is also necessary to provide them with timely feedback on their performance. Thus, we recommend that medical schools minimize the time scheduled for grading first-semester examinations. To ensure timely grading, both faculty commitment and administrative support are essential.

A second step in the identification of at-risk students is regular, structural monitoring of students' progress *throughout* the medical course. It has been shown that risk factors for poor performance vary at different stages of the first year and of the medical course.[16,17,39] Although there are students who struggle right from the start, the need for support sometimes becomes apparent later in the first year[17] or even in clinical training.[25,39] Therefore, we recommend that medical schools regularly monitor the progress of all students.

In addition to regular monitoring, medical schools should aim to identify the reasons for underperformance, especially in clinical training. There is an urgent need for research into the causes of the lower clinical grades achieved by

students from ethnic minority groups and by first-generation university students.[39] First, research is required to determine whether these groups of students are less well prepared for clinical training than other students despite receiving the same preclinical training and, if so, why this is the case. Second, more detailed experimental studies might assist in improving understanding of the processes underlying judgment and decision making in clinical assessments. Third, interventions should be considered, designed, implemented, and evaluated. Possible interventions include (1) attempts to make assessment in clinical training less subjective, starting with considering diversity both in test construction and implementation[40]; and (2) efforts to create awareness of cultural bias—among students and assessors— and to develop a greater understanding of cultural differences through cultural competency training for all involved in clinical training.[41]

It should be noted that the problems experienced by medical students are many and varied.[7,42,43] Therefore, finding a totally fail-safe means of early detection of at-risk students should not be expected. Failure due to social or health-related problems may be especially difficult to predict. Routine monitoring of a number of academic and behavioral criteria will enable medical schools to notice (sudden) drops in performance at an early stage, however. Student counselors—support staff who provide students with advice and information on study progress—should play an important role in determining whether detected students would benefit from individual (Tier 3), group (Tier 2), or exit (Tier 0) support.

Use Evidence-Based and Targeted Interventions

The fifth and final core principle of the 4T-CABS model is that support should be adapted to the needs of the different identified groups and that interventions should be evidence based. For students who are eligible for referral to another degree program, Tier 0 support should focus on assisting in the decision to withdraw and on providing realistic alternatives. The same applies for students who are dismissed one or two years after enrollment. Currently, too little attention is given to so-called exit

interviews, but such interviews may be crucial to retaining these students in higher education and may also provide further insight into why they failed to thrive in their medical course.[43] This latter information could be used to improve admissions policies.

For at-risk students identified as eligible for individual or group support, various types of interventions are required.[44] For some of these students, an academic warning may be sufficient; others may need academic support. Nowadays, the support offered typically consists of an academic guidance interview with a student counselor. However, as described above, other types of support may be more appropriate to improve students' progress. Recently, we showed that a short, integrated study skills program benefited at-risk students who had demonstrated commitment and academic potential.[9] This suggests that it is more effective to focus support efforts on students who almost meet the set standards than on those who have very little chance of success. Future studies are required to test this assumption, preferably using robust study designs such as randomized controlled trials. In a recent review, Cleland et al[6] also concluded that particular subgroups of students appear to respond better than others to remediation—in line with results from complex clinical intervention trials—and that more high-quality research is needed to find out what works and why in remediation for at-risk medical students.

Implementing the 4T-CABS Model

In sum, the 4T-CABS model's integrated approach for medical student success includes adequate instruction and clear, high (and realistic) expectations for all students; routine monitoring of a number of academic and behavioral criteria to identify students at risk of struggling; and multiple evidence-based types of support to address the variety of at-risk students' needs.

Most medical schools already have in place some or many of the interventions we have described. The added value of the 4T-CABS model is that it offers the required systemic and structured framework[15] to ensure that support is offered at different tiers and meets the differing needs of students. Such a

framework is often lacking in medical schools.[45] Although interventions at the different tiers need to be tailored to specific contexts,[15] the overall structure of the model and its core principles are applicable across contexts. In all contexts, it is important to focus both on academic and behavioral support and to offer timely and evidence-based support at different tiers. Additionally, adaptations in organizational culture may be required to ensure support for faculty, enabling their committed involvement in identifying and supporting struggling students.

Conclusion

Not all students cope successfully with the demands of medical school, and students' struggling may result in study delay or dropout. In view of the large investment in training made by both the student and society, preventing delay and dropout is an important goal. If medical schools wish to reduce delay and dropout, they need to identify students who are experiencing academic and/or behavioral difficulties at an early stage and provide them with timely interventions through access to support programs or, when appropriate, refer them to another degree program.

Ideally, medical schools should be able to distinguish early in the first year between struggling students who are willing and able to be remediated and those who would be better off switching to a nonmedical career. An important factor in making this distinction—in addition to study progress—is students' commitment to the medical course, which is reflected in their participation in scheduled learning activities and exams and in their willingness to participate in support programs.

We expect that adopting the 4T-CABS model of student support—which includes adequate instruction and high expectations for all students, targeted small-group interventions, individualized support, and exit support—will enable medical schools to maximize all their students' academic engagement and performance.

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