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Research paper



## Team principles for successful interdisciplinary research teams

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### ABSTRACT

Interdisciplinary research teams can be extremely beneficial when addressing difficult clinical problems. The incorporation of conceptual and methodological strategies from a variety of research disciplines and health professions yields transformative results. In this setting, the long-term goal of team science is to improve patient care, with emphasis on population health outcomes. However, team principles necessary for effective research teams are rarely taught in health professional schools. To form successful interdisciplinary research teams in cardio-oncology and beyond, guiding principles and organizational recommendations are necessary. Cardiovascular disease results in annual direct costs of \$220 billion (about \$680 per person in the US) and is the leading cause of death for cancer survivors, including adult survivors of childhood cancers. Optimizing cardio-oncology research in interdisciplinary research teams has the potential to aid in the investigation of strategies for saving hundreds of thousands of lives each year in the United States and mitigating the annual cost of cardiovascular disease. Despite published reports on experiences developing research teams across organizations, specialties and settings, there is no single journal article that compiles principles for cardiology or cardio-oncology research teams. In this review, recurring threads linked to working as a team, as well as optimal methods, advantages, and problems that arise when managing teams are described in the context of career development and research. The worth and hurdles of a team approach, based on practical lessons learned from establishing our multidisciplinary research team and information gleaned from relevant specialties in the development of a successful team are presented.

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## 1. Introduction

Interdisciplinary teams produce powerful collaborative research (1). Interdisciplinary research teams, as described by the National Institute of Health and a Scientific Statement from the American Heart Association are critical for tackling challenging clinical problems (1,2). Impactful and transformative results are obtained by incorporating conceptual and methodological strategies from a variety of research disciplines and health professions (1). In this paper, we outline principles for a successful research team, with a particular emphasis on their effectiveness in cardio-oncology settings. Interdisciplinary teams are becoming more critical for collaborative scientific discoveries, necessitating careful strategies to meet research aims while overcoming potential conflicts (3). Team approaches offer a greater pool of viewpoints, capabilities, and efforts. The prevalence of cardiovascular disease in adults in the general population is ~50 % (including hypertension) and ~10 % (excluding hypertension) (4), associated with ~\$220 billion in direct costs annually (4). Cardiovascular disease is also a leading cause of death among cancer survivors (5–7). Nearly 17 million Americans are cancer survivors (8), a number that is expected to exceed 22 million by 2030 (9). Approximately 500,000 of these adults are survivors of childhood cancers; 1 in every 750 Americans is a survivor of childhood cancer (8,10). 1 in 10 childhood cancer survivors are at high risk for cardiovascular disease and will develop cardiovascular disease (11). Optimizing cardio-oncology research in interdisciplinary research teams will help investigate how to save hundreds of thousands of lives each year in the United States and to help mitigate the annual cost of cardiovascular disease, which is expected to more than double over the next two decades (12). Interdisciplinary research teams should therefore be leveraged for cardiology, and especially cardio-oncology, to maximize research outcomes for translation to patient care.

Several groups have reported their experiences with building research teams in various specialties and settings. Few journal articles provide practical methods for building team infrastructure, this is particularly unavailable in cardiology, or cardio-oncology. Providing such a publication will help in creating a collaborative atmosphere, particularly one that includes opportunities for learning and team building (13). This requires that translational teams have the abilities, expertise, and mindset to overcome obstacles and capitalize on the benefits of interdisciplinary collaboration (14). These skills are developed using successful tactics (14), including understanding the problem space; identifying translational challenges that need to be addressed by the team; and identifying potential strategies to meet the identified translational team needs (14).

Coalescing key team principles is helpful for groups of researchers and clinicians interested in building interdisciplinary teams, particularly those that will incorporate training and mentorship as part of career development goals for the entire team. Therefore, in this article, suggestions for success in interdisciplinary teams are offered based on comprehensive literature review, integrated with lessons learned from our own experience. In a companion article titled “Establishing an Interdisciplinary Research Team for Cardio-Oncology Artificial Intelligence Informatics Precision and Health Equity”, the process of building an optimal interdisciplinary research team customized for our group, along with initial findings from an epidemiological cohort developed by our team, are described (15).

## 2. Forming interdisciplinary research teams

The successful interdisciplinary research team includes individuals from a variety of specialties (16). Networking is advantageous for establishing and reestablishing connections (17) to develop a pool from which to build the team, or from whom potential team members can be identified (3). When forming the interdisciplinary team, several factors must be considered (3). Foremost, the establishment of a needs analysis to inform the setting of priorities is crucial for effectively forming an

interdisciplinary team in a high-stress, fast-changing healthcare environment (17,18). Next, interdisciplinary collaboration of researchers, administrators, and clinicians from various allied health specialties should be carefully crafted (18). Clinical health experts can provide a variety of insights to the project as well as mentorship (18). Building a team entails bringing people together and providing psychological safety for all teammates, while having a shared research aim (3). Determine team dynamics that persuade the group to create trust, enhance communication, and collaborate towards a shared purpose (17). Team composition in research is an essential factor that influences overall performance. Team processes and results related to team effectiveness are influenced by team structure, tasks, and organizational context (19). In establishing a well-rounded research team, the fundamental concepts to consider include team objectives, team member characteristics (such as competency and personality), team diversity and demographics, and project timeline (20). Roles and tasks should be clearly assigned to the extent possible, to limit ambiguity and permit recognition of each member's efforts (3). Establishing rules entails agreeing on how the team will make choices, how data and information will be shared, and how disputes will be managed (3).

The team leader and project manager guide the team through this process. These roles may be combined and performed by the same individual but in some cases, especially in large teams, these may be undertaken by separate individuals. Depending on their experience and interest, the project manager may participate in the actual research project beyond team coordination. The project manager early on should provide the team with information and principles regarding the purpose and conduct of the project(s) being undertaken. The standard expectation should be established early on that each team member's voice will be heard and valued to optimize the team's collaborative insight and output. The project manager and team leader should listen to all suggestions from team members and have the team decide together either during a virtual meeting or by follow-up individual phone calls, emails, or brief in-person meetings regarding how to establish team rules, roles, and tasks. A project manager can assist with planning and communication while ensuring that the project is completed on time (3). The project manager can also assist in securing grant funding, from an administrative, scientific, and financial perspective (3). For multi-institutional teams, data use agreements or memoranda of understanding can be put in place to help solidify ground rules for engagement among the team across organizations. It is beneficial to list the required functional roles and assign job titles at the time of project initiation (3). Speaking with other department members to identify technical or clinical specialists who have previously collaborated is also beneficial (3). Planning to include collaborators who may be required during most or all project phases will ensure team success (3). While it is possible to identify potential collaborators based on specific skill sets, the most critical factor to consider is selecting team members who exhibit positive attitudes, possess the basic skills necessary to collaborate (3), and can assist on a larger scale (3). For instance, involving a statistician during the planning phase allows for appropriate data collection from the start and avoids potential duplication of efforts in the future (3). In addition, engaging clinical administrators in the overall interdisciplinary collaboration may assist in removing administrative roadblocks in projects and grant funding applications (3). Collaborating with patients, patient advocates, or patient experience administrators also benefits team projects (3). In general, the team leader should communicate to each team member the benefits of participation and emphasize the value of the team's exposure to each collaborator (3). For researchers new to a particular institution, presenting insightful information about the project at a meeting of another department is beneficial in identifying collaborators (3). For multi-institutional teams, data use agreements or memoranda of understanding should be put in place to help solidify ground rules for engagement among the team across organizations.

### 3. Principles for success of interdisciplinary research teams

#### 3.1. Team building

Due to the increasing complexity of scientific, health, and societal problems, multiple disciplines are needed to fully comprehend and develop solutions (40). It can be quite challenging to build a team that is highly efficient and cohesive. To this end, the National Research Council launched an initiative to investigate and translate the knowledge, skills, and attitudes that contribute to the effectiveness of science teams (21). To build the skills required for team effectiveness in producing and communicating scientific findings, several factors need to be evaluated. Effective interdisciplinary teams must identify specific aims and goals and choose participants in the team with appropriate skills set and attitude. Team diversity, consisting of collaborators of varying backgrounds, with scientific, technical, and stakeholder expertise increases team productivity (22). Teams may be assembled by individual scientists, institution research administrators, or funding agencies. Once the team has been assembled, it is critical to engage all participants through brainstorming ideas about the vision or goal of the project (3). During this stage of the team-building process, the roles and responsibilities of each team member are defined. Additionally, the group members' various backgrounds could lead to tension and disagreement (3). Notably, the team leader may have an initial vision for the research project, but once it is presented to the team, individual members may interpret it differently based on their prior research, clinical, or work backgrounds (3). This may take the project in a variety of directions (3). Understanding each member's vision, communication style, and preference may help in overcoming additional obstacles (3). It is critical to accept all ideas, discuss them collectively, and ultimately develop an approach to focus on a single idea or develop multiple projects on a related topic (3). For example, a team leader may initiate an idea for the group to consider, such as developing a shared decision-making aid for physicians and patients. Networking and collaborations among team members may reveal an opportunity to create a digital, patient-informed algorithm that would provide personalized results. The team leader and project manager can guide the group towards collaborative new ideas, or improvement on existing ideas, for the team to pursue. A synthesized version of the original idea would emerge after several iterative listening sessions, with opportunities for shared facilitation, brainstorming, and feedback. If the team leader were to insist on only the original idea developed in isolation, the new innovative approach would never be discovered. When everyone on the team is given the opportunity to help develop team projects and commit to seeing a shared vision through, the vision and the team become a living force (17). Clearly addressing deadlines at the start and throughout the project will help team members with project prioritization and time management. Designating tasks, establishing rules, and determining authorship norms are all important aspects in building a successful team for collaborative scientific projects (3). Addressing authorship at the outset ensures that everyone on the team is aware of the tasks that must be done in order to earn authorship (3). Team members should have appropriate access to documents being used and discussed by the team, including a list of team members with brief descriptions of their positions and roles on the team. Periodic reports on actions taken by the team and planned next steps are also helpful.

#### 3.2. Virtual team building

Particularly in the COVID-19 pandemic, an outcome of the global impact on our academic community has been the adoption more broadly of virtual meetings. Research teams have found it essential to pivot to video conference meetings, to maintain focus and determine useful research questions that are meaningful, timely, and focused on long-term results (16). Teams serving racial and ethnic minority populations in Milwaukee WI found this to be essential, to continue

collaborative team projects serving a population in which the team had already built trust (16). Teams in Milwaukee were able to adapt to available resources and channel resources towards studies that could benefit those who were structurally disadvantaged and most affected by the pandemic. Thus, utilizing virtual communication during the pandemic facilitated the continuation and advancement of community-based research that depended on uninterrupted relationships and conversations among researchers and between researchers and the community being served.

#### 3.3. Diverse perspectives in collaboration

Working in silos may produce quick short-term achievements but hamper independent long-term success. Diverse teams comprised of individuals with different complementary expertise are comparatively successful (23). Flexibility, resilience, and innovation are enhanced by a diversity of talents, experiences, and perspectives (24). One of the benefits of working with individuals across different disciplines in the team is the availability of different perspectives and avenues to pursue to obtain the necessary research data. Involving individuals from across an institution can facilitate data gathering that may otherwise be quite challenging. This can ensure that insights from both new and existing relationships of individual stakeholders are appropriately incorporated into the steps needed for the research. For example, Stvilia et al. (22) investigated 1415 experiments carried out by several research teams at the National High Magnetic Field laboratory between 2005 and 2008. The authors observed that interdisciplinary diversity of the experimental teams was associated with higher research productivity, as measured by their volumes of publications. Personality traits of individual collaborators are equally impactful towards team success.

Establishing a secure environment that facilitates the exchange of ideas and viewpoints is important (24). Organizational strength is achieved by empowering team members to feel secure in their contributions and to thrive in their roles (24). A successful team is one in which all members are actively involved and dedicated in achieving a common objective, while also being given the opportunity to lead in their own right (24). Key elements during project discussions must include demonstrated willingness to listen deeply, speak thoughtfully, explain carefully, and be open to all perspectives. These attributes all make the team stronger and more effective (3,25). All team members must be made aware of how their efforts contribute to the overall team. In general, the team leader should emphasize the advantages of involvement and perspectives of all team members. Priorities should be discussed as a team, with all members giving input. The team leader or other assigned individual such as the project manager can keep track of who may not yet have had a chance to weigh in on team discussions and can ensure that no voice is lost in a meeting. Follow-up emails can also be sent to individual team members to ensure that all opinions are heard.

#### 3.4. Team leadership

The roles of team leadership are managing task allocation to completion, team direction, and member motivation (26). Leadership is dynamic and complex, adapting to the team's structure. The leadership technique depends on the individual's leadership style and overall impacts team effectiveness (21,27). Under certain circumstances, an assertive, task-oriented approach may be warranted, whilst in others, leaders may seek to promote and encourage members' suggestions and perspectives (28). The executive functions of leadership in interdisciplinary research teams primarily consist of strategic planning and conceptualization, encouraging innovative perspectives and proactiveness in the team members. Leaders must be able to envisage how different disciplines might overlap in productive ways to achieve scientific advances and provide new insights to problem areas. They must comprehend the significance of such initiatives, be able to articulate their vision to possible partners, and create an environment that

encourages collaboration (21,29,30). Assessing leadership competencies can be difficult; in literature, the most common indication of successful leadership has been team members' perceptions of their leader's competence, rather than direct assessments of team performance (21).

### 3.5. Team mentorship and sponsorship

Teams are comprised of individuals of varying disciplinary backgrounds, professional attainments and skill sets. For instance, students, ranging from undergraduates, graduate students, medical residents, and postdoctoral fellows, who are oftentimes in their formative research career years, may need mentoring by more experienced faculty researchers. In team science, mentoring is integral to the professional development of junior scientists and fosters retention of clinician scientists (31). If a senior faculty member is involved as a collaborator, this individual may serve as a valuable mentor and sponsor in identifying additional team members with whom they have previously collaborated successfully (3). Additionally, individual team members who also have their own mentors can invite their mentors to help share insights with the team. Interdisciplinary and interprofessional team mentorship has several key benefits and can help impart skills necessary to fully leverage diverse views in successful teams (25).

### 3.6. Modes of communication

Correspondence methods should be determined early on so that the team can reach out to each other between meetings and continue to address action items and plans without having to wait for the next large group meeting. The project manager or research program coordinator can assist with correspondence and arrange ad hoc meetings between large group sessions. In some ways, ad hoc meetings can sometimes use a co-working format, in which team members are simultaneously working on related portions of the projects and are able to synergize each other's work in real time.

Some groups have seen success subdividing time into different research areas (e.g., software development, data management, evaluation, etc.) and having specific meetings on those topics. For example, if there are three groups, then the month can be divided into one meeting per group, plus a team meeting once a month to come together and share progress. This minimizes scheduling burdens, which can sometimes be a challenge (25), while allowing all group members to stay informed and engaged.

Understanding how each team member prefers to operate, their personality and communication style, as well as each individual's preference for future feedback, may aid in overcoming additional obstacles (3). For instance, team members may have different communication preferences, with some preferring e-mail or text communication while others prefer in-person or telephone contact (3). Using web-based video conferencing applications can be advantageous for long-distance collaborations or even local collaborations where in-person meetings are prohibited or limited (3), such as during the coronavirus disease of 2019 (COVID-19) pandemic. Virtual-only meetings can help drive success in interdisciplinary teams. At the same time, it can be difficult to informally check in before or after virtual meetings regarding roles and contributions, while building collegial relationships with each other. Intentional email, phone, or in-person check-ins are helpful to help build team trust and solicit various perspectives from among the team.

### 3.7. Trust, cohesion, and human connection

In addition to communication and shared vision, trust and respect are important overarching themes of successful interprofessional collaboration (13). Relationships are at the core of effective networking and team building (18). People's time and expertise should be acknowledged, respected, and valued, with reciprocity (24). The development of trust and cohesiveness depends on establishing

psychological safety (3). Psychological safety fosters successful error mitigation and learning practices without fear of retribution. Errors are objectively identified, reflected upon and appropriate solutions instituted (32). Diverse science teams benefit from psychological safety as it ensures that their interactions are not overshadowed by colleagues of higher social power (33). It is also important in large disparate teams where initial trust can be critical, which is common in multi-institutional collaborations (33). Team cohesion impacts positively on team effectiveness, which is enhanced by team interdependency of tasks and skills (34). The ultimate goal of scientific productivity cannot be achieved without cohesiveness in team science (3,35). The team leader can facilitate this by ensuring that each member feels comfortable sharing their preferences, acknowledging those preferences (3), and equally connecting people from different fields and generations (24). Team members from various backgrounds can be invited to weigh in on team discussions, sharing their individual perspectives informed by their own experiences and knowledge of research from their specialized disciplines. In order to achieve organizational strength, team members must feel confident in their contributions and thrive in their roles (18,24). Additionally, encouraging and modeling a healthy lifestyle contributes to healthy teams, team cohesiveness, and human connection (24). These methods demonstrate success as defined by how the team enriches and influences the lives of team members and others (24).

### 3.8. Project planning

The initial task in establishing a multidisciplinary team is to outline the scientific aims and subject areas of the collaboration (3,36). This will determine member characteristics and expertise during recruitment. Project planning around a specific research topic then ensues. Conducting a literature search on potential topics and developing the research question or topic using the references cited in those articles can be a useful first step (3). Reading current literature and participating in journal clubs with faculty peers may also result in new research or publication ideas (3). Additionally, this process can identify current knowledge gaps in the field, resulting in collaborative projects (3). Adaptation and flexibility are crucial as the team learns how to flow together to determine, craft, and execute projects. Once the scientific objectives and goals have been established (3), project organizational setup is important to sort out and can be a focus during budget justification discussions. Recognizing the role that each team member will play can be captured in grant applications and budgets, in addition to baseline foundational discussions when the team is being formed. The organizational setup can evolve over time, as various components of the project are tackled, and as new information is gained. As the team gleans more data and the project transforms, the organization of team members can also follow suit appropriately. In designing steps of the project, each team member should give input that leverages their skills and interests, so that the steps design for the project can be choreographed smoothly with modifications as needed. Publications by the team should include essentially all team members, with careful consideration given to placement of authorship, which often can be best established early on when the team is being built, when projects are being designed, or when data is being analyzed and interpreted. Early on, principles on which the team makes decisions should be established. Communication about reasons behind decisions should be ensured. Obstacles should be reframed as opportunities.

### 3.9. Team training

When team members learn skills that enable team success, interdisciplinary partnerships improve (37). Team training can take many forms and involves interventions that increase team efficiency by providing requisite knowledge and skill sets (38,39). Team training can take many forms. Essentially team training should focus on improving the skills, knowledge and attitudes of team members (21,40). Team development

strategies can include workshops on evidence-based team building skills, with pre- and post-workshop questionnaires (37). Workshops tend to be highly rated, especially regarding training on psychological safety and readiness to collaborate (37). Teams that foster an environment conducive to collaboration by providing learning, team-building, and leadership development opportunities can help hone essential abilities and promote attitudes and cognitions that are predictive of success (13,37,41). Cross-training is another team training strategy, where “interpositional knowledge” is taught (21). Team members can acquire diverse skills and competencies shared by other team members, in addition to their own pre-existing skillsets (38). This fosters cohesive team interactions, shared mental models and adaptation to changing environmental situations (38,42). Bisbey et al. (33) lay out an evidence-based framework for team science training employing the TeamMAPPs program. The overall framework of the TeamMAPPs model involves three competency sets. The first competency set involves awareness and is information exchange. For a science team to be effective, its members must be able to share and integrate their knowledge. As a result, scientific effectiveness relies on each member’s expertise, background, and skills. This approach is particularly useful for large teams and those geographically distant and institutionally separated, since it facilitates coordination and reduces inherent differences. Second, a climate of psychological safety in teams allows members to have a shared feeling of freedom in sharing without fear of backlash. Researchers found that teams with high levels of psychological safety are more engaged and have better learning and performance results. The third competency set involves adaptation and correction. Effective science teams adapt and self-correct continually and re-examine team member skills and backgrounds. A distinguishing characteristic of the TeamMAPPs program is its versatility, with the potential to include assessment, training, and evaluation. There are learned behaviors associated with each of these sets which guide the learning program (33).

### 3.10. Team science models for multi-team systems

Many existing conceptual models offer insight into the complexities of implementing or evaluating traditional team-based research and very few report on multi-team systems (43). Teams are successful when teamwork (regarding relational, effective, and cognitive factors, along with psychological safety) and roles (for strategy, project management, and goal setting) are efficiently coordinated. In multi-team systems (MTS), these needs are exacerbated. Effective leadership and performance assessment structures are then required to coordinate these teams to align with the organization’s aim (44). The three most reported forms of interdisciplinary research include multidisciplinary, interdisciplinary, and transdisciplinary research. Transdisciplinary research integrates and extends discipline-specific methodologies to develop fundamentally new conceptual models, research hypothesis, systems, and empirical applications that supersede their disciplinary foundations, advancing innovation and scientific knowledge (45). Its appeal lies in its focus on methodologies that provide applicable solutions to problems (32).

### 3.11. Challenges of interdisciplinary team building

#### 3.11.1. Team diversity

Uniqueness in perspectives and skills across team members can benefit decision-making and improve outcomes. Team member characteristics such as an individual’s role or reputation, gender, or ethnicity may influence their actions and perceptions of themselves as well as other team members, which could impact efficiency and outcome (20). Individuals who share a similar profile may consider themselves part of an inner circle and may excommunicate those with dissimilar traits. Interestingly, a meta-analysis by Bell et al. investigated various operational definitions of “diversity” such as team expertise, similarities/

differences among team members), and inequality in skills and experience level, and the effect of diversity on team productivity and outcomes (46). They also studied the impact of innovation, creativity, and task-related diversity on performance and reported a positive performance correlation with functional background diversity (professional expertise of members) which is a form of task related diversity.

#### 3.11.2. Team size

Large team sizes and dispersed team members can present substantial problem for team efficiency, in terms of maintaining goal alignment, cooperation, and sustaining team objectives. Large teams may experience deviation in objectives as the team expands, with members becoming siloed and divergent in their contributions (33). This can be exacerbated for teams that are multi-institutional and in different geographical regions (47). Leaders of big teams could benefit from consulting training specialists to determine the level of “interpositional knowledge” required to facilitate team-wide behavioral alignment. Geographically dispersed team members can benefit from training to comprehend each other’s skills and tasks, as well as context-driven and team-contingent competencies. Cross-training and knowledge growth may aid coordination by providing this insight (21).

#### 3.11.3. Goal misalignment

Goal misalignment stems from team members being uninformed of shared goals, or team’s practices and expectations outside the purview of team training and best practices. Awareness of the overall objective and the interconnectedness of the teams’ objectives can be strengthened through reflexivity training or professional development programs (21).

#### 3.11.4. Group faultlines

Faultlines are potential team factions based on structure (for instance, a team of two cardio-oncologists and two medical oncologists forms a possible faultline based on discipline (21). When differences in members’ compositions become apparent, for instance when the team must determine how to allocate resources or tasks, faultlines are said to be “activated”, as these subgroups may only support decisions that protect their interests, increasing the possibility of conflict. Conflicts arising from faultlines can be mitigated by developing superordinate team identification and goals (21). Another way to solve faultlines is by specifying task assignments across the subgroups. For instance, team members with similar skills, even across disciplines, may be grouped to work on different aspects of the projects.

#### 3.11.5. Team funding

Pilot funds are commonly used to encourage the formation of multidisciplinary research teams (37). The American Heart Association has recently invested millions of dollars in funding for Strategically Focused Research Networks (SFRNs) formed by interdisciplinary teams dedicated to studying racial and ethnic health disparities in cardiology. Furthermore, the American Heart Association has encouraged communication and relationship-building across all networks’ sites (both inside and across the networks) in current and prior SFRN funding periods (41). The National Institutes of Health also funds and supports interdisciplinary research teams. Research groups should plan to obtain pilot funding together and expand their funding pool with extramural federal, society, and foundation grants.

## 4. Conclusion

Working in interdisciplinary multi-institutional teams can be invigorating and exciting. A variety of expertise is convened, leading to combined energy and knowledge. Complex and multifactorial topics such as chronic disease or health disparities in cardio-oncology can be identifiable and addressable in interdisciplinary research teams. Organizing and managing such interdisciplinary teams can be challenging. Developing a cohesive and highly efficient team can be difficult, and this



**Fig. 1.** Team science principles for successful interdisciplinary research teams. Templates from Infograpia were used in these graphics.

can be a daunting task for junior faculty (3). However, effective team assembly and functioning is enabled by processes such as fluid team formation, specialized project management, and decision-making based on specific milestones (48), as well as a thoughtful approach (3) and valuing the voice of each team member. Key elements in the creation of successful interdisciplinary teams also include collective acquisition of knowledge and team project management (49). Other assets include the ability to set goals with an eye towards the future direction of the system and the ability to achieve and accomplish goals in the face of constant change (17). It is also vital to practice relationship adaptability, and to have the capacity to change course rapidly (17). The overarching team principles can be summarized as focusing on Team Building, Leadership, Discussions, Mentorship, Training, Planning, Communication and Collaboration (Fig. 1). Adopting these themes and approaches can accelerate innovation and breakthroughs and generate more holistic findings that are more applicable to health interventions (50,51). Interdisciplinary teams can be considered to behave like a complex adaptive system of individuals (49). The actions of the individuals are interdependent and affect the system's overall performance (50, 53). When faced with challenges, the system exhibits emergent self-organized behaviors to maintain itself (49), similar to the emergence of cardio-oncology as a medical and research specialty to overcome cardiovascular challenges in cancer therapy (50,51). Teams demonstrating these principles, as well as adaptability and teamwork, are likely to be successful in current and future initiatives. The breadth of knowledge obtained from such collaborations can be rewarding.

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Conception and design: SAB  
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## Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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