Assessment and evaluation of the Danish Cardiovascular Academy (DCA)

Overall assessment and evaluation of the Academy

The DCA was established in 2021, funded for a 6-years period by the Novo Nordisk

Foundation (NNF) and the Danish Heart Foundation (HF) with the mission to establish an elite academy for excellent interdisciplinary education and training to improve the understanding of different aspects of cardiovascular disease.

In the end of the first year an organisation had been established with the formation of a steering committee, educational components, grants, courses and meetings. In addition, staff members had been appointed and employed to support the organisation. DCA has its physical premises at Aarhus University with a satellite office in Copenhagen.

The SWOT analysis appears to be genuinely thorough, honest and consistent with the annual reports. Weaknesses are clearly highlighted, particularly the challenge of developing courses that appeal to clinicians. It is also emphasized that the understanding of clinicians´ needs cannot be fully addressed, as DCA is not allowed to employ clinicians. This could potentially change in the future. In line with this it has also been challenging to spread DCA´s message outside of university hospitals and to understand the need for training at various levels. This should be reflected upon and improved moving forward.

It would have been valuable to know who conducted the SWOT analysis.

The establishment of DCA is likely a good way to unite and streamline cardiovascular research and education in Denmark. However, a review period of just over three years is not sufficient to form an accurate assessment of how optimal the current organisation is, or how well it functions in its various components. Nevertheless, as the ambition to succeed on all fronts has been high over the past years, and as the establishment of an entirely new organisation has progressed remarkably quickly, it may seem strange that not all parts have functioned entirely satisfactorily over the past years. But, building a completely new structure that covers research as well as education and networking is a significant challenge, and sometimes it´s difficult to get all components to work perfectly from the start. A lack of resources, particularly administrative ones, may have hindered the process. It also takes time to find the right balance and optimise all functions, especially when new initiatives are launched.

Considering how DCA has developed in the short time since its formation, there is every reason to believe that the organisation and its functions will continue to mature and develop in a satisfactory manner moving forward and thus constitute “more than the sum of its parts”.

DCA is on the right path to succeed with its mission, but more time is needed.

Organization and Structure

The distribution of positions across different employers in the country may be a disadvantage due to divided loyalty. Otherwise, I don´t have any comments on how the organisation is structured or where it is physically located except that it might be successful to have satellites in at least every university hospital in Denmark.

As pointed out in the SWOT analysis, the small secretariat is very vulnerable and poses a threat to the functionality of DCA if it cannot be secured.

Governance: Decision-making Mechanisms:

It is difficult to determine how transparent the various decision-making bodies are within DCA. How is the reporting done? Is there any principle/policy mad up for this?

Educational activities

DCA´s activities are open to all researchers early in their careers, and collaboration takes place with universities and other health care academies in Denmark. The term "early in their careers" should be clarified and most probably broadened. The fact that the majority of participants in training activities come from the Copenhagen area is a concern that should be addressed moving forward.

DCA has not succeeded in attracting participants to courses and seminars from sources other than university-affiliated individuals (80%), with the worst participation coming from the industry.

Taking this into account, DCA has still largely succeeded in achieving its goals regarding educational activities.

Network and Collaboration Activities

DCA´s network development combines scientific and social activities with the aim of helping participants get to know each other. However, it seems unclear how this has been evaluated, if at all, and what outcomes should be measured? Perhaps the question arises: should common scientific publications be used as a metric?

DCA has not yet established formal collaborations with international partners, though it has set up international scholarships. To evaluate the effectiveness of their activities, it could be beneficial to use a combination of both qualitative and quantitative metrics, such as joint publications or the impact of scholarships in terms of fostering international collaborations.

Regarding industry collaboration, it seems that DCA has not been successful. If industry partnerships are a key goal, it might be useful to evaluate the barriers preventing such collaborations. Is it a matter of lack of alignment between DCA´s activities and industry needs, or perhaps the absence of a structured approach to outreach and build relationship with industry partners? One way forward could be to investigate what kind of industries or sectors align best with DCA´s work and explore potential incentives for industry players to engage.

Recruitment: Grant Activities

It sounds like DCA has been successful with its doctoral and post-doctoral scholarships, with a high quality of applicants. However, since there hasn´t been enough time for a full evaluation of the outcomes yet, it could be useful to develop a framework for tracking long- term results. E.g. gather some initial feedback from grant recipients about their experiences and how the funding has influenced their research or career paths, assessing the number of publications, collaborations, or career advancements that result from these grants.

Scientific Output

DCA has performed at a high level according to bibliometric measures, especially considering the time since the academy´s establishment. Bibliometric data, such as the number of publications, citation impact, and collaboration patterns, can provide valuable insights int the academy reach and influence of DCA´s work.

Outreach and Communication

DCA has made a strong effort to communicate its vision and mission through a combination of traditional scientific channels, like courses, seminars, and publications, alongside more modern approaches such as social media, newsletters, and its website. This multi-channel approach is an effective way to increase visibility and build a strong brand presence in the cardiovascular care space in Denmark. But again: How to concretely measure the outcomes of this communication strategy?

Financial overview

DCA has secured funding from other sources outside NNF and HF, mainly focusing this funding to educational purposes. Anyhow, more funding will be needed in the future to achieve its long-term vision, especially considering the ambitions around educational activities and international exchange that DCA until now did not fully achieve.

Review of the Danish Cardiovascular Academy

Overall assessment and evaluation of the Academy

The Danish Cardiovascular Academy (DCA) has proven to be a remarkable success, fostering collaboration and engagement among both basic and clinical scientists in the field of cardiovascular research. The Academy represents a promising platform to expand collaborations with international entities, thereby enhancing its global reach and fostering greater internationalization. A standout feature of the Academy is its cross-sectional and cross-sectorial activities, which offer a unique and valuable dimension to its initiatives. The Academy has established a robust organizational structure and a clear, forward-looking vision, ensuring sustained growth and progress. The mentor-duo system as well as the part-time funding for clinicians are a particular asset, providing unique opportunities for guidance and support to trainees. The justification for a national body like the DCA is clear, given its ability to unite key stakeholders in cardiovascular research and train the next generation of scientists. The Academy unquestionably adds value as it acts as a cohesive platform that amplifies the collective impact of its individual components. Its successful implementation is poised to generate significant short- and long-term benefits for the field of cardiovascular research in Denmark. There is no doubt that the Academy is a successful and unique program to strengthen cardiovascular research in Denmark and prepare the generation of future cardiovascular researchers.

The SWOT analysis provided in the self-evaluation report is generally adequate but could be improved by addressing missed elements such as differences in the subareas of cardiovascular research. There is also a notable threat of the program becoming rigid and not adapting promptly to evolving needs, which could compromise quality over time. The Academy seems to organize a large number of training and engagement activities, and this may dilute the quality of some initiatives. A more focused approach emphasizing high-quality, key training courses could enhance the overall impact.

Faculty involvement seems uneven, possibly due to a perceived lack of direct benefits for them. There is a risk of faculty viewing their involvement as a one-sided obligation. Addressing faculty needs and aligning activities with their interests could foster greater participation and commitment. A balanced approach that acknowledges and caters to their professional development needs could mitigate this risk. The Academy's approach to organizing training activities may also be too rigid and locally focused, which could hinder its ability to attract and accommodate more national and international faculty and collaborators. Some roles, such as those of certain committees, lack clarity, and the mechanisms for evaluating the success of individual grantees remain to be developed. Additionally, the engagement of disciplines such as public health and epidemiology is still limited, though there is potential for growth in this area.

To address these challenges, the Academy should prioritize high-quality training courses over quantity, ensuring that each initiative delivers maximum impact. Activities that provide tangible benefits to faculty members, such as professional development opportunities or recognition programs, could be introduced. Clear responsibilities for all stakeholders should be defined, and broader metrics to also evaluate the long-term success of individual grantees and the Academy as a whole should be established.

Efforts to engage public health and epidemiology researchers should be increased to broaden the Academy's scope and impact. Moreover, considerations for enhancing internationalization and better involving alumni could optimize the current setup further. Lastly, fostering partnerships with global entities in cardiovacular research and adopting a more international outlook could attract more diverse talent and resources.

Organization and Structure
The Academy has a logical organization and structure are essential for achieving the Academy's goals, which should be kept. However, it is a bit unclear how the various heterogeneous areas of cardiovascular research are organized. A more refined structure could offer quicker insights into what works and what doesn't, such as identifying in which subareas interdisciplinary or intersectoral engagement is most effective.

Establishing a separate working group dedicated to internationalization could prove valuable. This would enhance the Academy's global outreach and foster collaborations that align with its objectives. While the creation of a functioning organizational body is a notable strength, the lack of mechanisms to evaluate specific aspects and provide immediate responses represents an area for potential improvement. Developing these structures could significantly enhance the Academy's ability to adapt and optimize its initiatives effectively.

Governance: Decision-making Mechanisms
The governance and decision-making mechanisms appear to be clear and transparent, with a commendable focus on quality. The necessary structures are in place; however, the roles of the Early Career Advisory Committee and the International Advisory Committee remain somewhat vague. These committees could be more effectively utilized to evaluate the Academy's current activities and suggest ideas for modifications. Additionally, they could play a pivotal role in advancing the Academy's internationalization efforts, ensuring its global outreach and collaboration strategies are robust and impactful.

Educational activities
Since its implementation in 2021, the Danish Cardiovascular Academy (DCA) has assembled an impressive array of educational activities, with clearly defined objectives and aims. While a broad range of research areas are covered, some, such as public health, have been identified as requiring greater attention. Enhancing evaluation methods, particularly through more representative assessments, could further improve the Academy's impact. Alternative approaches, such as collecting immediate feedback on the spot from both faculty and attendees, may provide valuable insights and help refine the prioritization of educational activities.

Top-down approaches, even when based on apparent deficiencies, have limitations. A more participatory model could be more effective, involving stakeholders at multiple levels. For instance, engaging PhD students in the organization of symposia not only fosters their professional development but also encourages greater participation from attendees and faculty. Faculty members are often more inclined to engage when approached by students, creating a collaborative environment that strengthens the Academy's initiatives.

Recruitment: Grant Activities
The grant activities of the DCA are clearly outlined and align well with the Academy's strategic goals. There appears to be no immediate need to expand the portfolio of grant activities; instead,

the focus should be on optimizing the existing ones. For instance, visiting professorships seem to be underperforming relative to expectations. This aspect could be actively enhanced by involving trainees from the outset and considering the potential for visiting professors to serve as short-term mentors for selected trainees joining the mentor duos.

It is premature to assess whether the Academy has successfully recruited the very best international talents at this early stage. However, the Academy demonstrates strong potential to achieve this objective over time. Additionally, the co-financing agreements have proven to be an effective model for engaging national bodies and represent a valuable asset to the Academy's operations.

Scientific Output
It is still too early to fully evaluate the scientific output of the DCA. However, the evidence provided thus far indicates a substantial impact on scientific publications, underscoring the Academy's potential to become a major player in cardiovascular research in Denmark.

To strengthen future evaluations, additional criteria could include tracking the careers of former trainees and their scientific contributions to the field. Establishing an alumni organization could further support these efforts by enabling the Academy to monitor long-term career trajectories and the broader scientific impact of its alumni. This approach would provide a more comprehensive understanding of the Academy's enduring contributions to cardiovascular research.

Outreach and Communication
The Academy has demonstrated clear efforts in engaging with outreach activities, including meet the scientist events, maintaining a presence on social media, websites, and other platforms. These efforts have been successful and align with expectations for an organization of its caliber.
Given the rapidly evolving landscape of social media and the changing dynamics of scientific communication, involving trainees even more in these activities could add further value. Initiatives such as podcasts or short videos featuring trainees presenting their research findings could enhance the Academy's visibility and engagement on social media platforms. This approach would not only promote the Academy's work but also provide trainees with valuable experience in science communication.

Financial overview
The distribution of funding appears to be both fully justified and reasonable. The Academy has demonstrated its ability to secure adequate funding from various additional sources, ensuring financial stability and growth. Furthermore, if permitted by the legal framework, high-level seminars and conferences organized by the Academy could be leveraged as opportunities to generate federal income. This could be achieved through partnerships with industry sponsors or by charging participants from the industry, thereby creating a sustainable funding model while maintaining the Academy's academic and research excellence.

Conclusion regarding the performance and quality of the Academy
In conclusion, the Danish Cardiovascular Academy has established itself as a significant and promising institution in the field of cardiovascular research. The Academy has proven successful in fostering collaboration among scientists, offering a comprehensive platform for international engagement, and maintaining a strong organizational structure. The Academy's initiatives, such as

the mentor-duo system and part-time funding for clinicians, contribute to a supportive environment for training and professional growth, further adding to its value.

There are areas for improvement, particularly in streamlining educational offerings to ensure and maintain a focus on high-quality, impactful training. Engaging faculty members more effectively and addressing their needs could enhance their involvement, and clearer structures for evaluating success and defining roles would strengthen the Academy's adaptability and effectiveness. The integration of public health and epidemiology into its programs, as well as a more robust internationalization strategy, would expand the Academy's scope and global influence.

The governance and decision-making processes are transparent and effective, though the roles of specific committees, such as the Early Career Advisory and International Advisory Committees, could be better defined. Additionally, although the Academy has demonstrated potential in scientific output, it is still early to fully assess its long-term impact. The Academy's efforts in outreach and communication have been successful, and further involving trainees in these activities would enhance visibility and engagement.

Review of the Danish Cardiovascular Academy

The Danish Cardiovascular Academy (DCA) is a highly commendable initiative, and its vision of "preventing cardiovascular disease and improving quality of life of patients with cardiovascular disease" is beyond question of the highest individual and societal relevance. It set out, in 2021, with the Mission "to establish an elite academy for excellent interdisciplinary education and training to improve understanding of disease mechanisms, diagnosis, treatment and prevention of cardiovascular disease".

It is rather early to try and assess overall progress made, as even the earliest supported PhD projects are likely to still be worked on, while personal academic progress of funded postdocs will be equally hard to quantify after such a short period of time. Also, assessing scientific output is challenging at this stage too, as the number and perception of 56 peer-reviewed papers (all but one from 2023/24) arising from about 120 person-years[1] in >60 individual projects cannot easily be contextualised. The DCA team have offered a detailed SWAT analysis, and this reviewer agrees in principle with most of the identified pros and cons (more specific detail below). Clearly, a lot of effort has gone into this programme, and while a fuller examination may only be possible after another 3 years or so, the DCA clearly is on an excellent track.

There are a couple of aspects, where further conceptual development may be prudent, as the strategic objectives of the DCA, as stated in 2021, call for it to play a more substantial role than that of a funding body that offers subject-focussed training. This is clearly what the DCA leadership are working hard to achieve.

Strategic aim 1 called for recruitment of "the most excellent PhD students and post-doctoral fellows within the field of cardiovascular research". This doesn't stipulate the cohort from which such selection is to occur. If this were to be international, then the DCA would be well advised to strengthen its presence, networking and appeal abroad. English language training activities, for example, would have to be the rule, and a proactive international advisory board would be needed, while integration with similar developments in Scandinavia, Europe and North America might need to be ramped up. If the aim is meant to be restricted to the most excellent trainees in Denmark, more information on how the DCA may bring together all national graduate training programmes in cardiovascular medicine would be welcome. Also, it is clear that the future of modern medicine depends on advanced technologies (data science, AI, materials and engineering, etc.). Therefore, a strategy is needed on how to recruit the best graduates from across different STEM subjects, combined with a structured training programme to bring these graduates from maths, engineering, natural sciences, etc., up to speed in medically inspired cardiovascular research. In addition, a clear link to subsequent employment opportunities outside academia is required, which ideally would build on engagement with and buy-in from industry (1- 2% industry participation at DCA events suggests room for improvement).

[1] (20 grants in 2021 × 3 years) + (21 grants in 2022 × 2 years) + (20 grants in 2023 ×1 year) + (27 grants in 2024 × 0 years) = 61 person-years of track record; this somewhat oversimplifies matters as it omits the fact that some grants will have ended since.

Strategic aim 2 proposed "to provide the world's best research training and education of PhD students and postdoctoral fellows within the field of cardiovascular research". Here, comments made above on integration of STEM trainees, and on international networking and integration apply as well. It is important to note that the concept of a 'post-doc crisis' in biomedical research has been discussed for a decade or so in the US, and it is increasingly becoming a topic in European academic communities, so there may be potential to learn from others.

Strategic aim 3 was "to establish an interdisciplinary and intersectoral national structure, unifying the Danish cardiovascular domain". Good progress clearly has been made in the link-up between basic and clinical research domains, but considering the needs of, and opportunities for, cardiovascular research experts in pharmaceutical and device industry, in publishing, policy making, or in advisory roles may well benefit from further focus in the next 3 years.

None of this should be taken as a criticism of the substantial progress made since the inception of the outstanding DCA imitative. It is an utterly necessary institution if we are ever to be in a position to address the folkesygdom #1 (or #2, depending on the statistics consulted...).

In terms of specific comments:

- Some of the best trainee support bodies conduct excellent retreats for their present and alumni fellows (too early, but perhaps something to be planned). This aids networking and could be spectacularly productive in a close-knit community such as that of DCA grantees. It might also aid intersectorial links, as at least some DCA fellows will inevitably move into domains outside academia.

- The range of training courses offered is somewhat narrow in its subject focus at present. This might benefit from a more 'curricular' design, where individual modules build on one-another. In fact, a pre-PhD course – in particular for graduates from STEM subjects – that would be held annually over a period of several weeks and cover the entire range from cardiovascular anatomy, physiology, cell biology through to clinical data gathering and analyses could allow the DCA to set up elite training for years to come. This might also contribute to increasing the awareness and attractiveness of the DCA, and raise application numbers. While that would necessitate a further reduction in the funding cut-off below 16%, that would seem to be in keeping with the ethos of being an 'elite academy'.

- The international make-up of the grants committee is outstanding; perhaps the training committee would benefit from international representation as well.

- The DCA has ~6 full time equivalent staff; this seem to be at odds with the SWAT analysis statement that the office is too small.

- There has been a move of progressive academic institutions away from ill-perceived social media platforms (e.g. #eXit); give the limited number of followers the DCA has there – such step would not hurt its functionality and reach. BTW: are all funded trainees followers of DCA on the various social media platforms?