

# Cardiovascular screening in elite cycling: time for change

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Prevent'able speaks with Prof. Guido Claessen (Hartcentrum Hasselt, Belgium), Prof. Aaron Baggish (University of Lausanne, Switzerland), and Prof. Alessandro Biffi (Med-Ex and Italian Federation of Sports Medicine, Rome, Italy) about the current practices and future directions of cardiovascular screening in professional cycling. Together with Prof. Xavier Bigard (Union Cycliste Internationale Medical Director), they reflect on how existing regulations could be improved to better safeguard the cardiovascular health of all professional cyclists.

## Prevent'able:

Professional cycling has a long tradition of cardiovascular screening. Could you outline the current system?

## Prof. Claessen:

The UCI requires an annual medical evaluation that includes history, physical examination, a cardiovascular questionnaire, a 12-lead electrocardiogram (ECG), and blood tests. Male WorldTeam and ProTeam riders must additionally undergo echocardiography and exercise testing, alternating every 2 years. Female riders receive annual evaluations but are not required to undergo echocardiography or exercise testing. In

disciplines like mountain biking, bicycle motocross (BMX) racing, and track cycling, only top-ranked athletes undergo annual medical monitoring, again without echocardiography or exercise testing. Other athletes competing in these disciplines follow national federation requirements.

## Prof. Bigard (UCI):

This programme represents a balance between athlete protection and practical constraints, but we are aware that it is imperfect and in need of evolution.

## Prevent'able:

Does evidence support routine echocardiography?

## Prof. Baggish:

There is little evidence that routine echocardiography adds meaningful value for preventing sudden cardiac death in healthy athletes. Unlike ECG, echocardiography rarely changes management when applied indiscriminately. Our position is that echocardiography should be performed at the start of a professional career to establish a baseline and then repeated only when clinically indicated, or perhaps every 6 years.

## Prof. Biffi:

Screening should focus on methods that have a track record of preventing adverse events. Echocardiography has not demonstrated effectiveness as a blanket screening test and should be used in a targeted way.

## Prof. Bigard:

Echocardiography is resource-intensive and has limited evidence supporting routine use. If experts agree on a baseline-plus-indication strategy, then it is our role to take this into account and translate it into feasible regulations.

## Prevent'able:

Cardiac magnetic resonance (CMR) imaging is considered the gold standard for cardiac imaging. Why is it not included in screening?

## Prof. Baggish:

CMR is a superb *second-line* test when symptoms or abnormalities on ECG, echocardiography, or exercise testing warrant further evaluation.

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It provides unmatched structural and tissue characterization. However, it is expensive, time-consuming, and not widely available. Crucially, we lack evidence that routine CMR screening reduces sudden cardiac death. Its role is therefore targeted, not universal.

**Prof. Claessen:**

When first-line tests raise suspicion (e.g. arrhythmias and unclear echocardiography findings), CMR becomes essential. But applying it to all riders is neither proportionate nor evidence-based.

**Prof. Bigard:**

For a global screening programme, feasibility matters. Even with its superior diagnostic quality, CMR is best reserved for second-tier evaluations.

**Prevent'able:**

What about exercise testing?

**Prof. Claessen:**

The foundation of screening remains history, clinical examination, and resting ECG. That said, in cycling specifically, annual exercise testing by a cycle ergometer—not treadmill—is very valuable, as it reflects the physiological demands of the sport. But it must be done maximally, not submaximally. Many potentially important findings, such as exercise-induced arrhythmias, only manifest at peak exertion. Interpretation requires expertise: isolated ventricular ectopy, for example, should not automatically trigger extensive work-up.

**Prof. Baggish:**

Where possible, cardiopulmonary exercise testing (CPET) on a cycle ergometer is preferable, as it integrates cardiovascular and pulmonary performance. Standard cycle ergometry remains a viable alternative, especially given logistical constraints.

**Prof. Bigard:**

Protocols must reflect cycling's physiology. A treadmill is not an appropriate tool for cyclists.

**Prevent'able:**

Cycling involves extreme workloads. Does this influence your screening approach?

**Prof. Biffi:**

Absolutely. Three-week Grand Tours expose riders to exceptional cumulative strain, daily maximal exertion with limited recovery. This supports annual maximal exercise testing and, potentially, periodic rhythm monitoring.

**Prof. Claessen:**

High lifetime training loads in cyclists are associated with structural remodelling and rhythm changes, particularly atrial arrhythmias. Screening should consider not only the competitive years but also the long-term follow-up after retirement.

**Prevent'able:**

Teams collect vast physiological data. Could these help improve screening?

**Prof. Baggish:**

Potentially, but implementation matters. Teams hold enormous datasets (power files, heart rate responses, and recovery metrics), but these are rarely integrated into medical oversight. Combining them with clinical assessments could enhance early warning signs, but it requires infrastructure and trust.

**Prof. Claessen:**

Cycling's measurement culture is an advantage. Riders already use numerous sensors, and wearable ECG devices may soon make real-time cardiovascular surveillance feasible.

**Prof. Bigard:**

The UCI is open to innovation. Wearables are promising, but they require validation before entering official protocols. And importantly, we must maintain strict data governance: all medical data belong to the riders.

**Prevent'able:**

What modifications to the current UCI protocol do you recommend?

**Prof. Claessen:**

A revised protocol should emphasize the essentials: annual history, clinical examination, and ECG. Echocardiography should be limited to baseline and selectively repeated, perhaps every 6 years or when clinically indicated. Exercise testing by a cycle ergometer should be annual and maximal, with CPET preferred where possible. Wearable-derived rhythm monitoring could be integrated as evidence grows.

**Prof. Baggish:**

This would streamline the system, focus on evidence-based tools, and remove unnecessary procedures. It would also promote equity between men and women and across all cycling disciplines.

**Prof. Biffi:**

Close collaboration with the UCI is crucial to translate expert consensus into practical and universal regulations.

**Prof. Bigard:**

The UCI welcomes expert guidance. Any protocol revision must balance scientific evidence, ethical fairness, and feasibility across all teams and disciplines.

**Prevent'able:**

The monitoring programme currently differs across genders, disciplines, and competitive levels. Is this justifiable?

**Prof. Baggish:**

Ethically, no. The cardiovascular risk of an elite female cyclist is not fundamentally different from that of a male cyclist. Female athletes often train as hard and race as intensely, yet their access to screening is limited because of financial constraints. That is inequitable.

**Prof. Claessen:**

All riders deserve equal protection. Screening is a matter of safety, and the current system implies that some athletes are 'worth' more protection than others.

**Prof. Biffi:**

We need universal standards. Women, mountain bikers, BMX riders, and track cyclists—all should receive the same type of screening at the elite level.

**Prof. Bigard:**

I fully agree. Budgetary differences between men's and women's teams, across disciplines, and between countries complicate harmonization, but none of this justifies weaker protection for any athlete. Equity must become a core principle of future regulations.

## Author contributions

Guido Claessen (Conceptualization [lead], Writing—original draft [lead], Writing—review & editing [lead]), Alessandro Biffi (Conceptualization [supporting], Writing—review & editing [supporting]), Xavier Bigard (Conceptualization [supporting], Writing—review & editing [supporting]), and Aaron L. Baggish (Conceptualization [equal], Writing—review & editing [supporting])

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