

NCAA DI Indoor Track & Field Data - An Analysis

Effects of the Global COVID-19 Pandemic
and Carbon-Plated Shoe Technology on
Annual Performance Lists 2015-2023



NCAA DI Indoor Track & Field Analysis - Synopsis 2015-2023

Introduction

The past decade has seen two major impacts on the performance of NCAA DI (USA National Collegiate Athletic Association Division I) athletes:

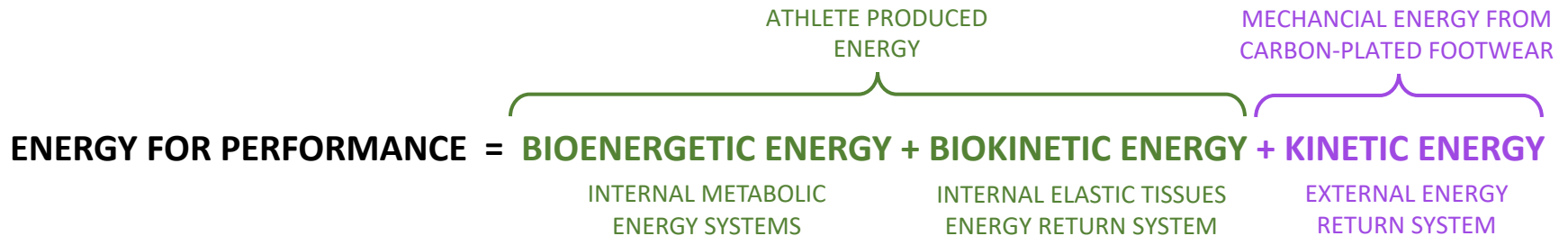
1. The COVID-19 Pandemic
2. The introduction and availability of Carbon-plated Footwear Technology

How can we identify and evaluate this impact of both COVID-19 and Carbon-plated Footwear Technology?

Performance Criteria

Examining performance criteria over time is one way of evaluating an impact. Normally, the number of athletes globally who exceed a certain performance criterion is relatively stable from year-to-year, with slight fluctuations in Olympic and pre-Olympic years. Also, it is expected to see a gradual increase in the number of athletes exceeding the criterion over time, through natural 'event development'. The years from 2015-2023 are analysed here.

Since the Carbon-plated footwear provides an added and external mechanical kinetic unit to the body's internal kinetic chain we can simply and accurately compare the differences in performance from when Carbon-plated shoes and spikes became globally available to the previous period, when athletes wore 'conventional' shoes and spikes.



Fatigue-Resistant Performance Enhancement

Carbon-plated track & field spikes specifically provide a fatigue-resistant performance enhancement to athletes through two potential sources:

1. An external, metabolic-sparing kinetic energy return
 - most relevant to improving Running Economy in Endurance: 800m - Marathon
2. Power amplification through the timing of an external kinetic energy return
 - most relevant in the force production phase of the 'Power' events: Sprints, Hurdles, Jumps, Throws and Combined Events.

What the Graphs Reveal by Event Group

Fatigue-Resistant Performance Enhancement

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Endurance

800m - 5000m All events show the significant impact of Carbon-plated spikes on improving performance for Men and Women continuing in 2023. Note: from late 2016 some Collegiate athletes wore Carbon-plated 'Road' shoes in indoor 3000m and 5000m track races and in 2023 continue to do so since the NCAA does not implement the WA restriction of a midsole thickness of ≤ 25 mm for track. (World Athletics restriction from Aug 2020).

Sprints & Hurdles

60m - 400m All events show the significant impact of Carbon-plated spikes on improving performance for Men and Women with Women's improvement showing the greater improvements in 2023, taking place a year behind the Men's.

Hurdles All hurdles show some significant improvement in the 2022-2023 indoor season and hurdlers may have taken longer to adjust to a changed stride pattern using the Carbon-plated spikes.

Jumps - Horizontal and Vertical

Jumps Men appear to still be in the process of recovering from the impact of COVID with the Pole Vault being the only improved event. Women in 2023 show continued improvement are still in the process of recovering from the impact of COVID

Throws - Linear and Rotational

Throws Men show a decline in both Shot and Weight Throw performance from 2022 to 2023 but are still superior to the pre-2021 performances. Women show some improvement in the Weight Throw but a decline in the Shot, still superior to the pre-2021

Combined Events

Heptathlon The number of Men exceeding 5,600 pts shows continuing and significant improvement

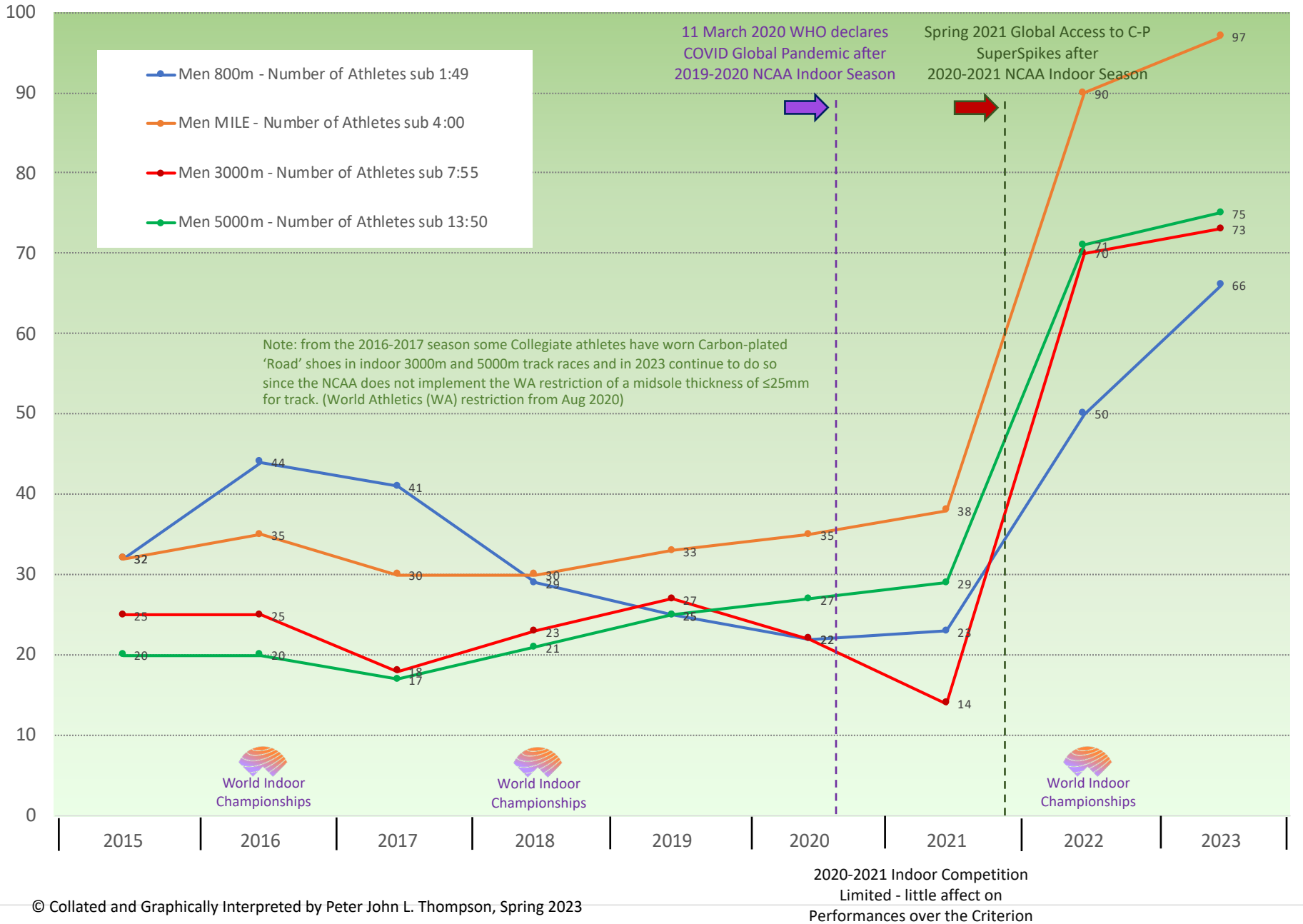
Pentathlon The number of Women exceeding 4,000 pts shows continuing and significant improvement

Note: With CE it may be an age-related response we are viewing since most CE athletes only really develop after Collegiate age.

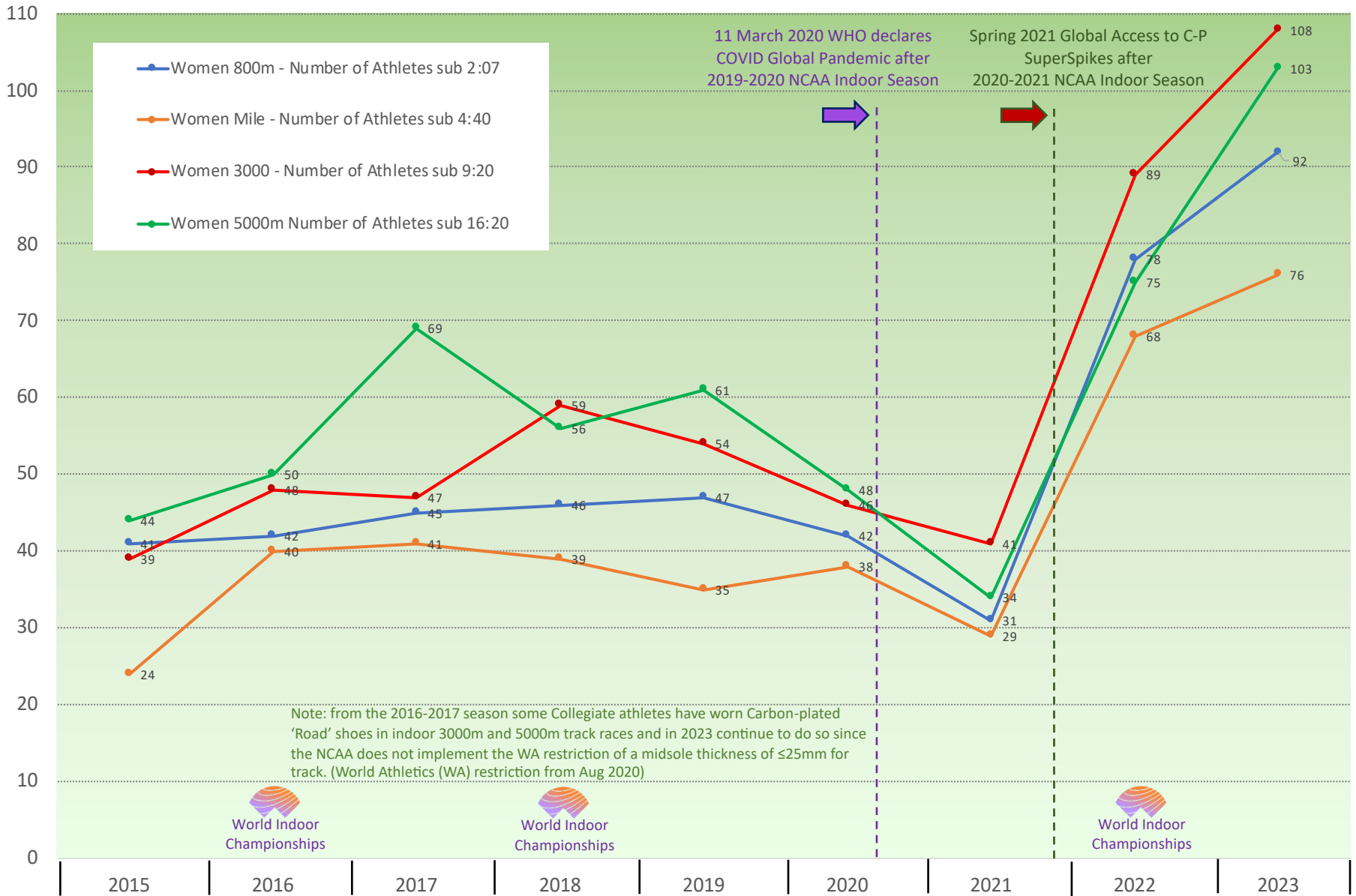
Conclusion

There is no disputing the significant impact of Carbon-plated spike technology on the running events at all velocities but this second-year re-evaluation for determining long-term impact and trends shows that improvements have been largely sustained or increased. The other event groups show impact but not such a consistent picture. This could be because the Carbon-plated footwear for the 'power' events was developed later, is not as widely available yet, or only available to the very elite Collegiate athletes.

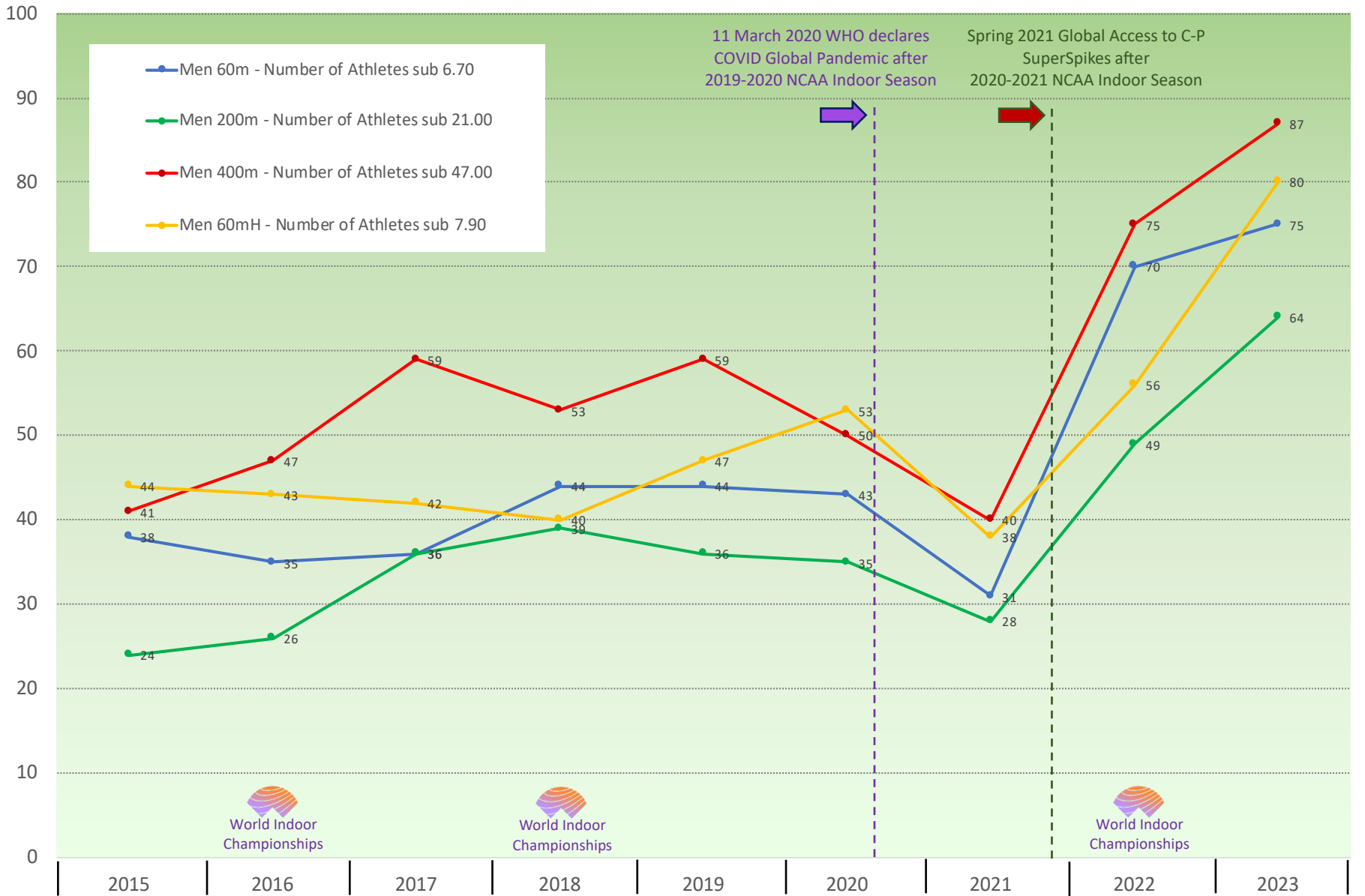
NCAA DI - Men Indoor Track 800m-5000m Performances 2015-2023



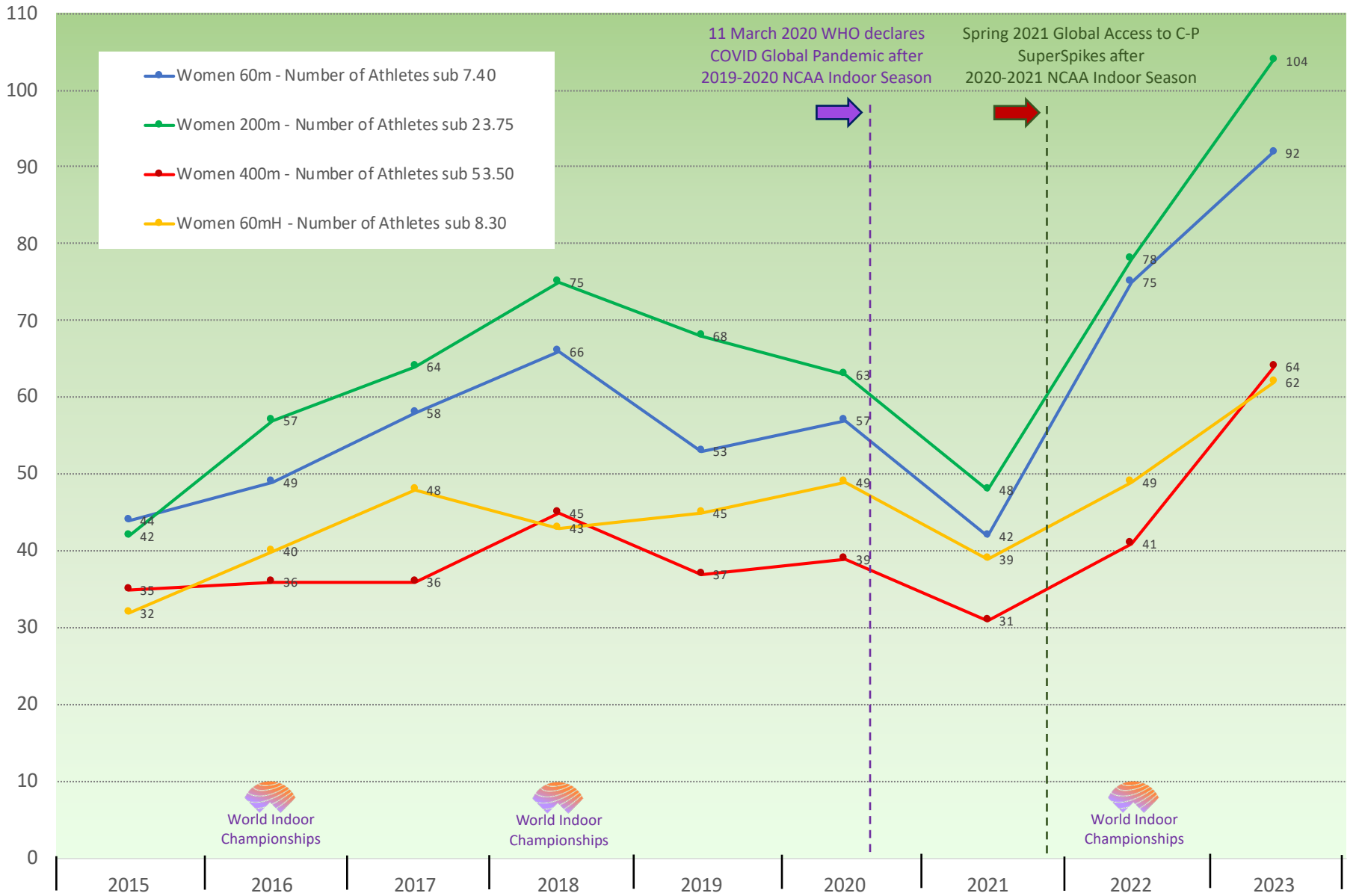
NCAA DI - Women Indoor Track 800m-5000m Performances 2015-2023



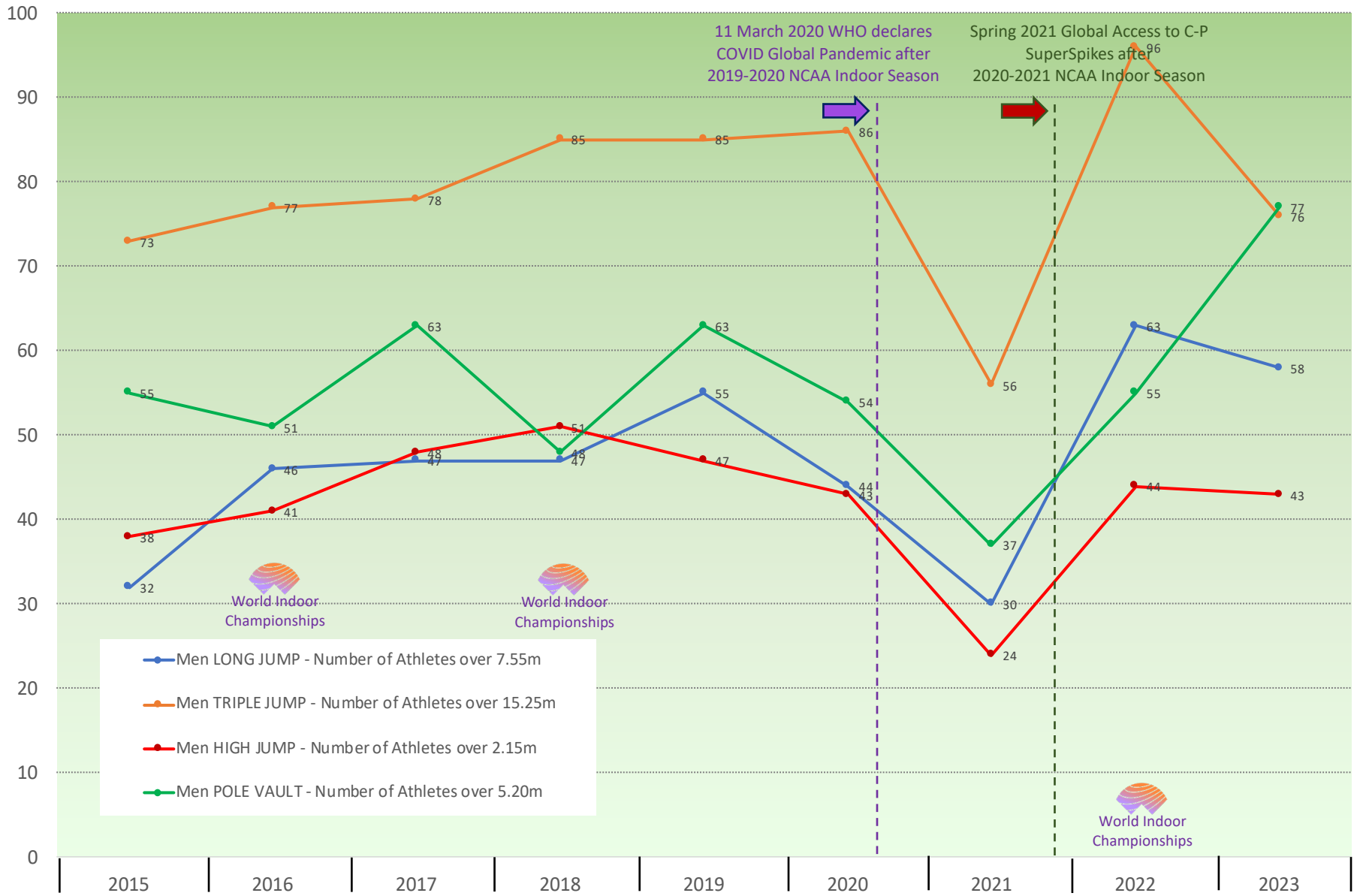
NCAA DI - Men Indoor SPRINTS & HURDLES Performances 2015-2023



NCAA DI - Women Indoor SPRINTS & HURDLES Performances 2015-2023

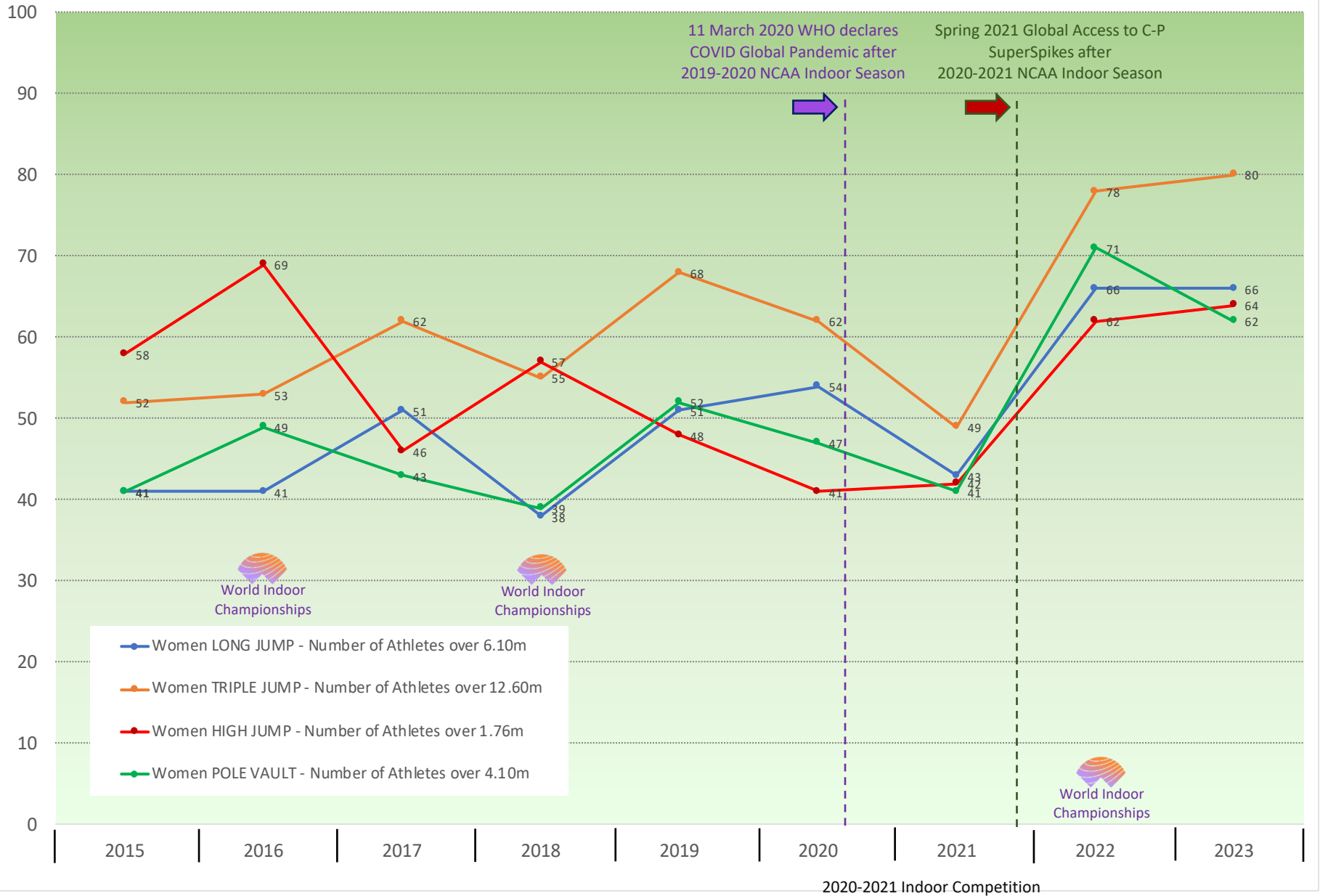


NCAA DI - Men Indoor JUMPS Performances 2015-2023

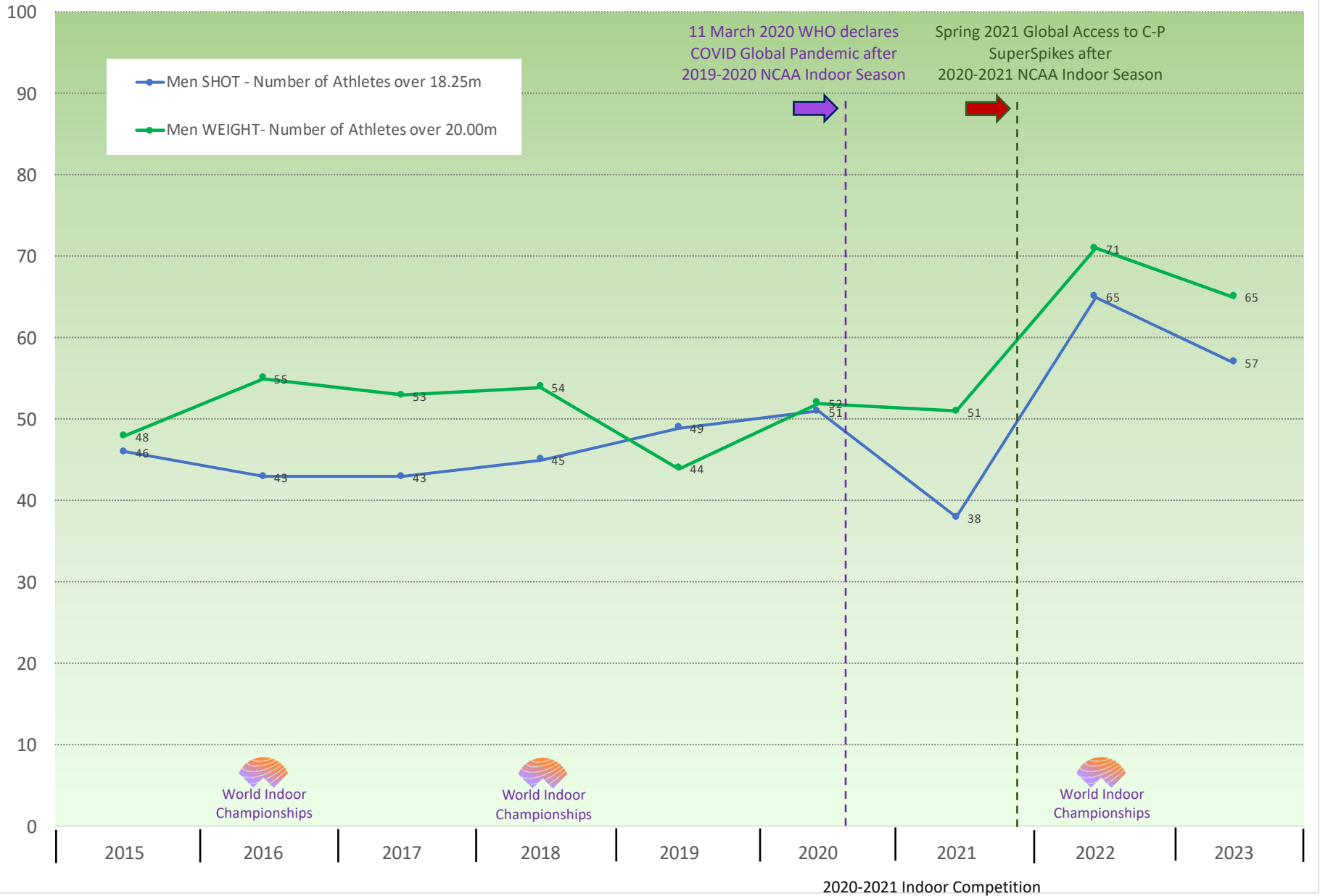


2020-2021 Indoor Competition
 Limited - little affect on
 Performances over the Criterion

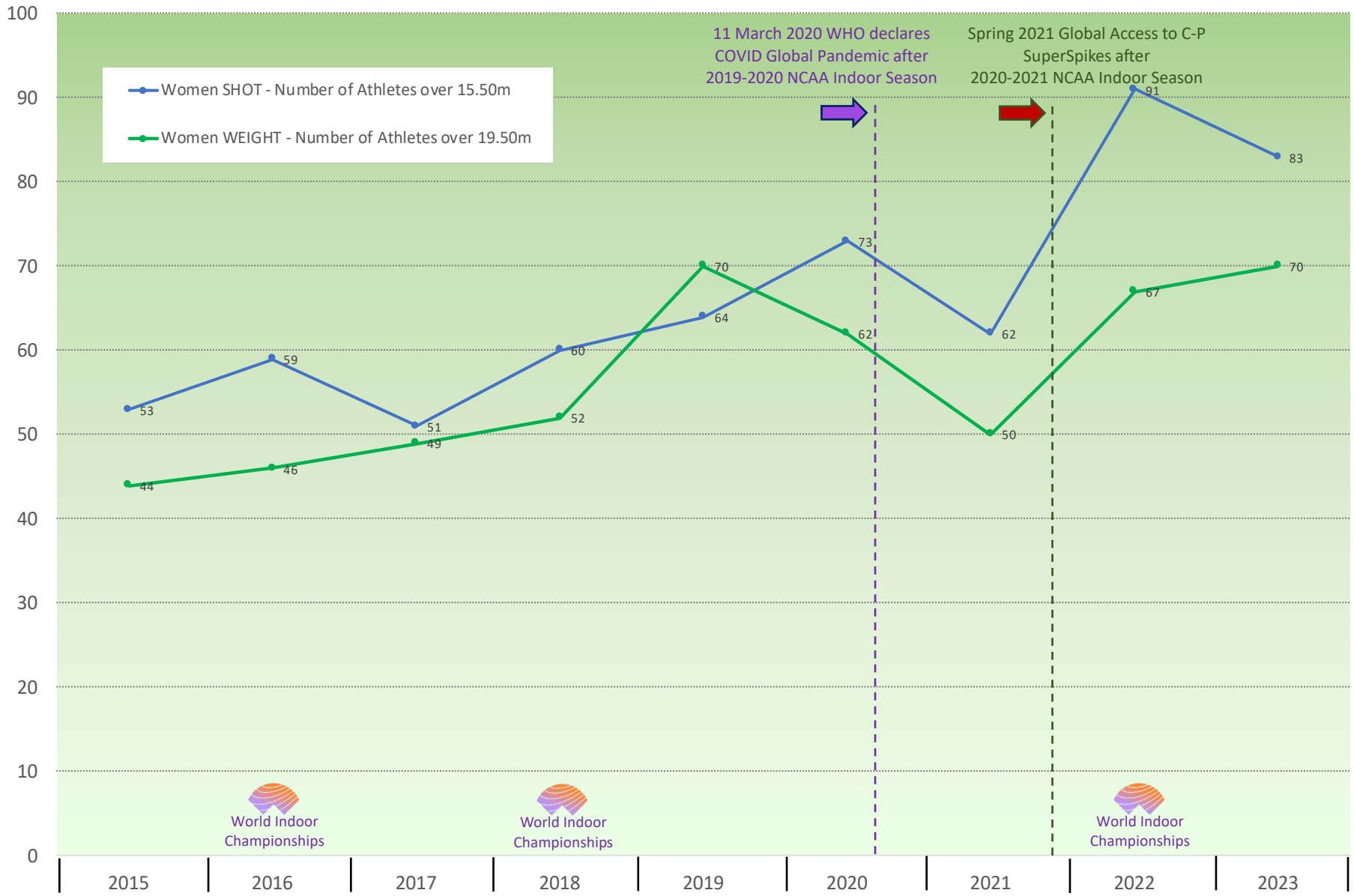
NCAA DI - Women Indoor JUMPS Performances 2015-2023



NCAA DI - Men Indoor THROWS Performances 2015-2023

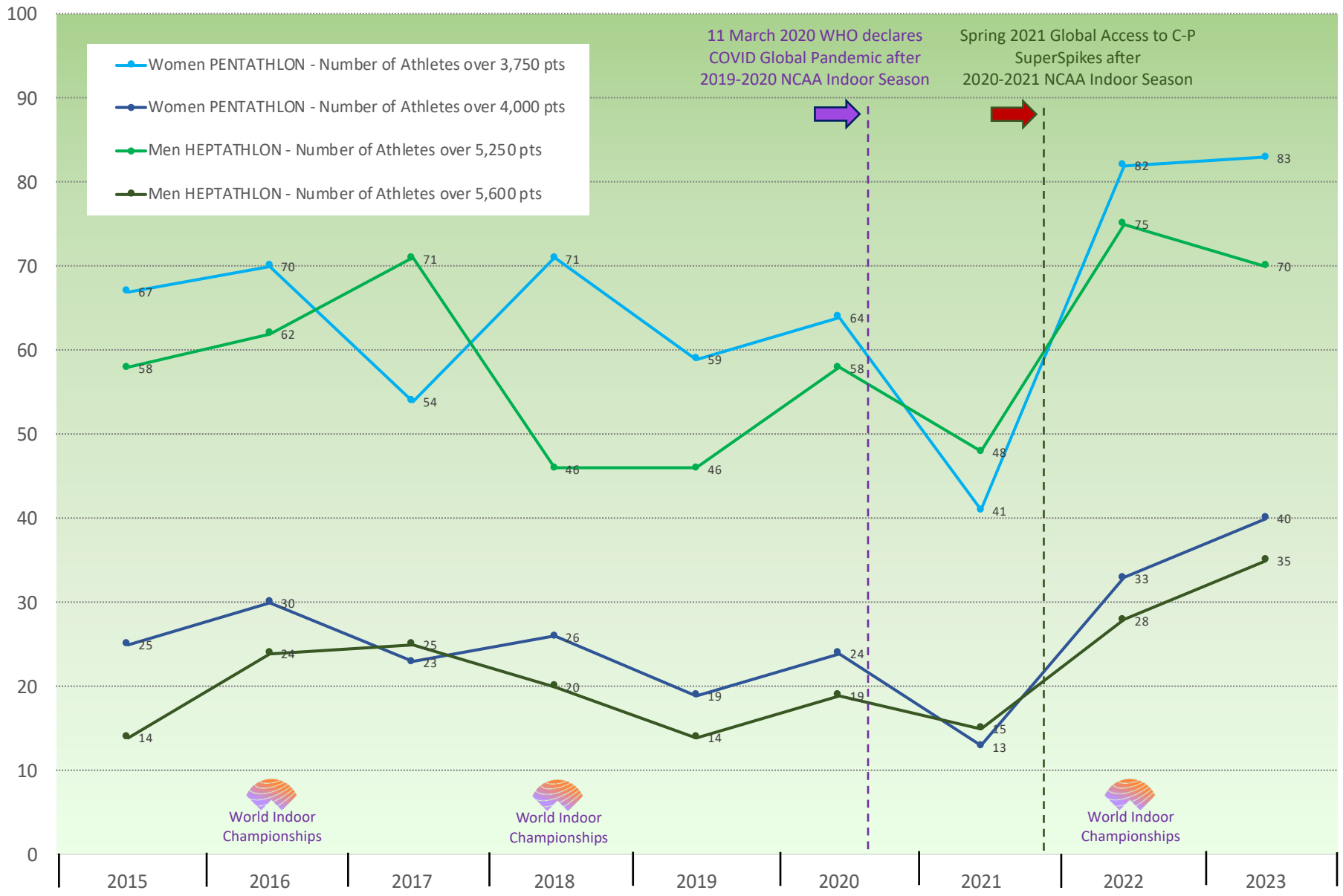


NCAA DI - Women Indoor THROWS Performances 2015-2023



2020-2021 Indoor Competition
 Limited - little affect on
 Performances over the Criterion

NCAA DI - Men and Women Indoor COMBINED EVENTS Performances 2015-2023



2020-2021 Indoor Competition Limited - little affect on Performances over the Criterion

TFRRS Data

TFRRS Data was used in the preparation of this Report

Sourced from the Public Website

https://www.tfrrs.org/indoor_lists.html