

World Athletics Indoor Data - An Analysis

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



World Athletics Indoor Data Analysis - Synopsis 2015-2023

Introduction

The past decade has seen two major impacts on the performance of athletes globally:

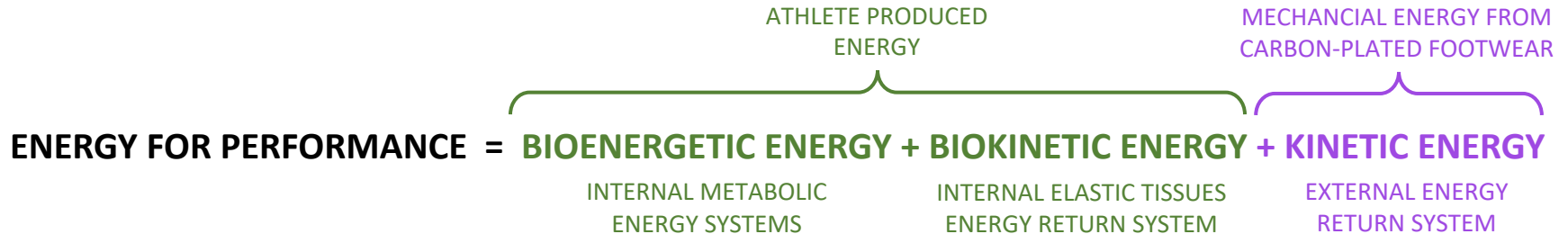
1. The COVID-19 Pandemic
2. The introduction and availability of Carbon-plated Footwear Technology

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

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

Endurance

800m - 5000m All events show the significant impact of Carbon-plated spikes on improving performance for Men and Women. For Men the 1500m and 5000m showed continued improvements in the 2023 season while the Women saw continued improvement in the 800m and 3000m. The 2016, 2018 and 2022 World Indoor Championships apparently affecting Men's choice of 3000m vs 5000m as a racing distance.
Note: from the 2016-2017 season some athletes wore Carbon-plated 'Road' shoes in 3000m and 5000m indoor track races until the 2020-2021 season when WA restricted the midsole thickness to ≤ 25 mm for track. (World Athletics (WA) restriction from Aug 2020)

Sprints & Hurdles

60m - 400m In 2023, all events show the significant impact of Carbon-plated spikes on improving performance for both Men and Women.
Hurdles Hurdles for Men and Women essentially maintains the improvement to exceed pre-COVID numbers in 2022 and 2023.

Jumps - Horizontal and Vertical

Jumps Men appear to still in the process of recovering from the impact of COVID in the jumps. Women in 2022 and 2023 maintain the improvement in LJ and TJ but in the HJ and PV are still in the process of recovering from the impact of COVID

Throws - Linear and Rotational Shot

Throws Men and Women appear to still in the process of recovering from the impact of COVID in the Shot

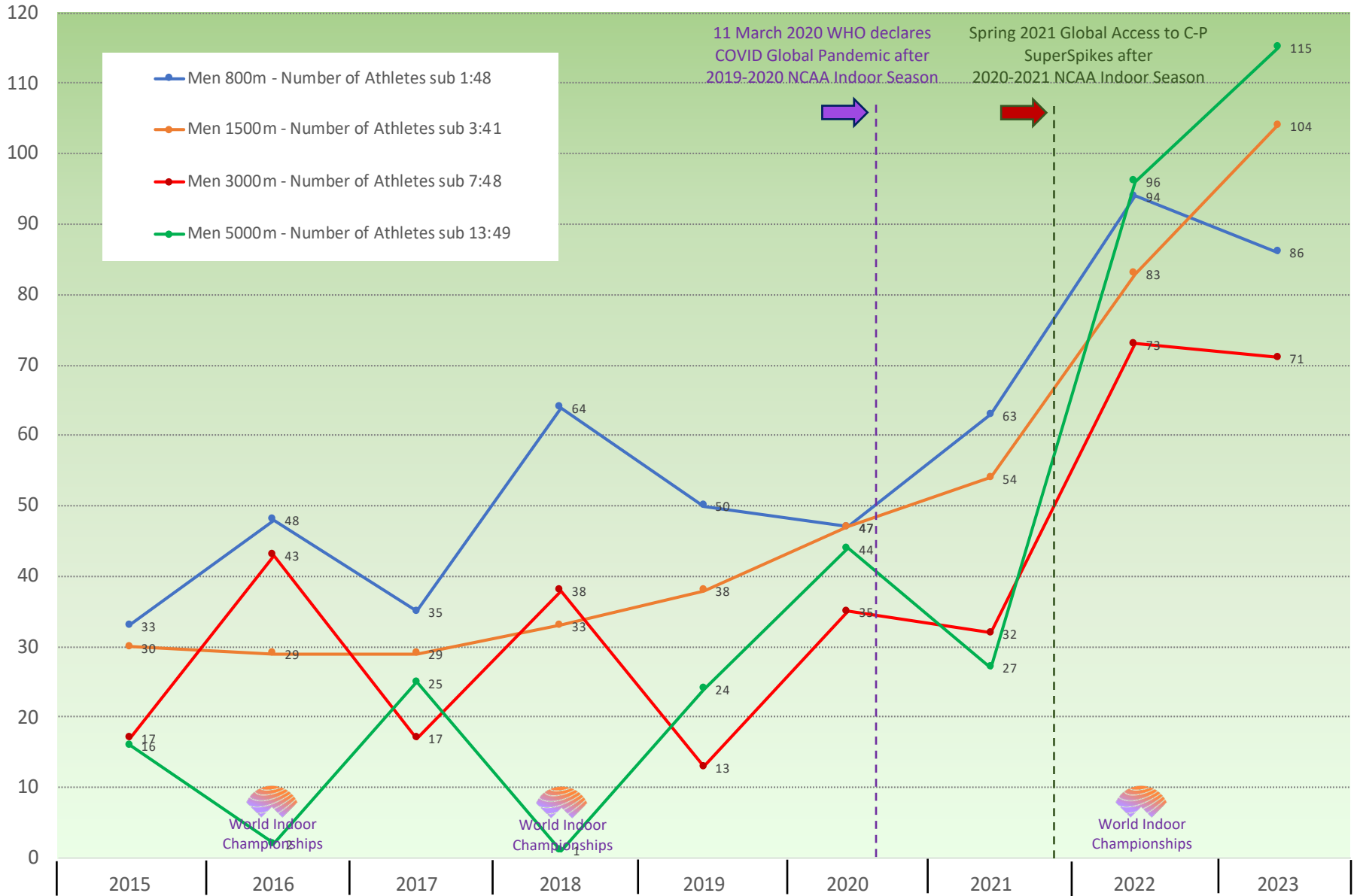
Combined Events

Heptathlon The number of Men exceeding 6,000 pts and 5,600 pts shows improvement in 2022 and continues the improvement in 2023
Pentathlon The number of Women exceeding 4,100 pts increased significantly in 2023 while those over 4,400 pts was stable.

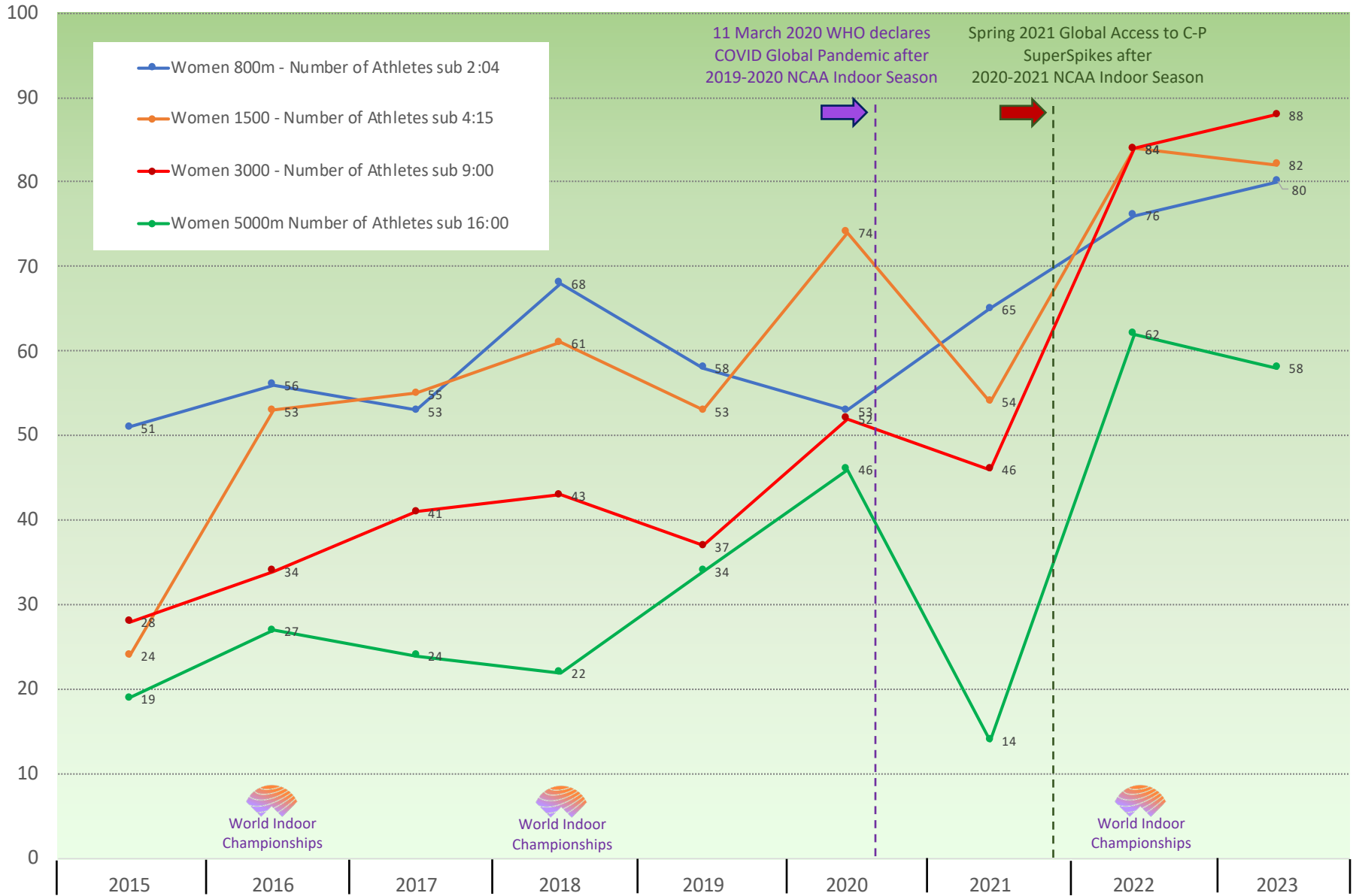
Conclusion

There is no disputing the significant impact of Carbon-plated spike technology on the running events at all velocities but this requires ongoing annual re-evaluation for assessment of long-term impact. The other event groups show impact but with 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, professional athletes.

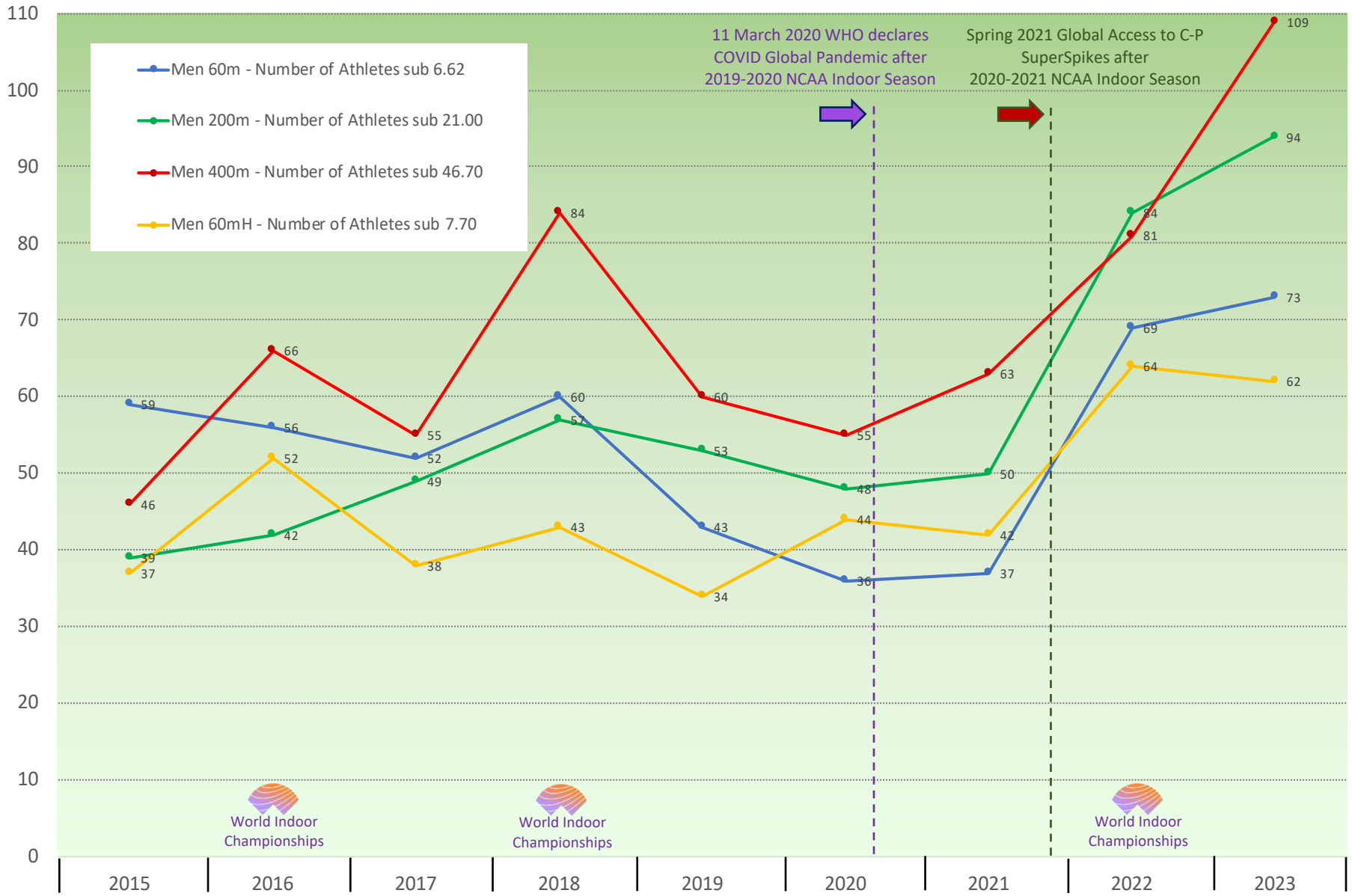
World Athletics Men Indoor 800m-5000m Performances 2015-2023



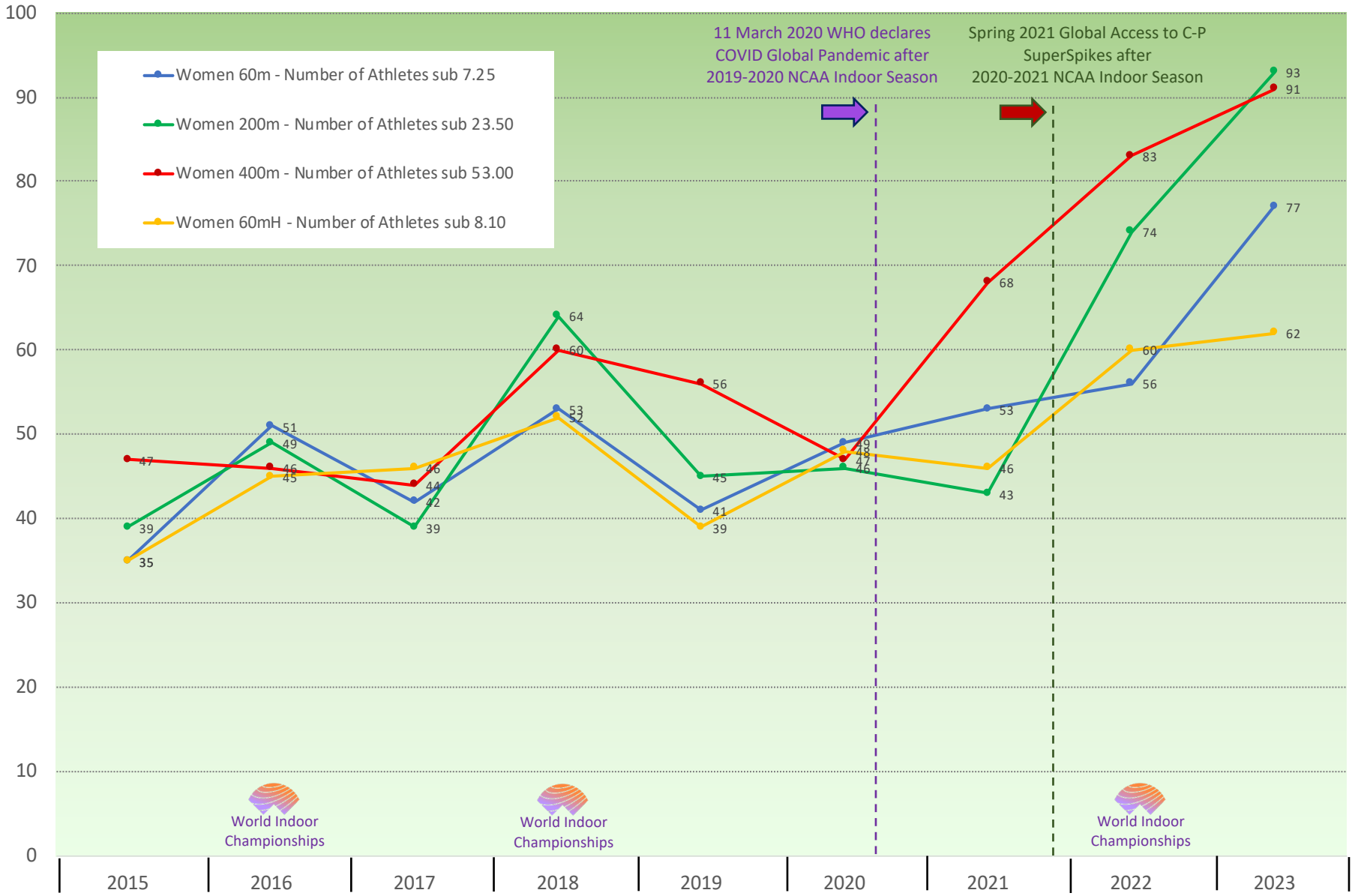
World Athletics Women Indoor Track 800m-5000m Performances 2015-2023



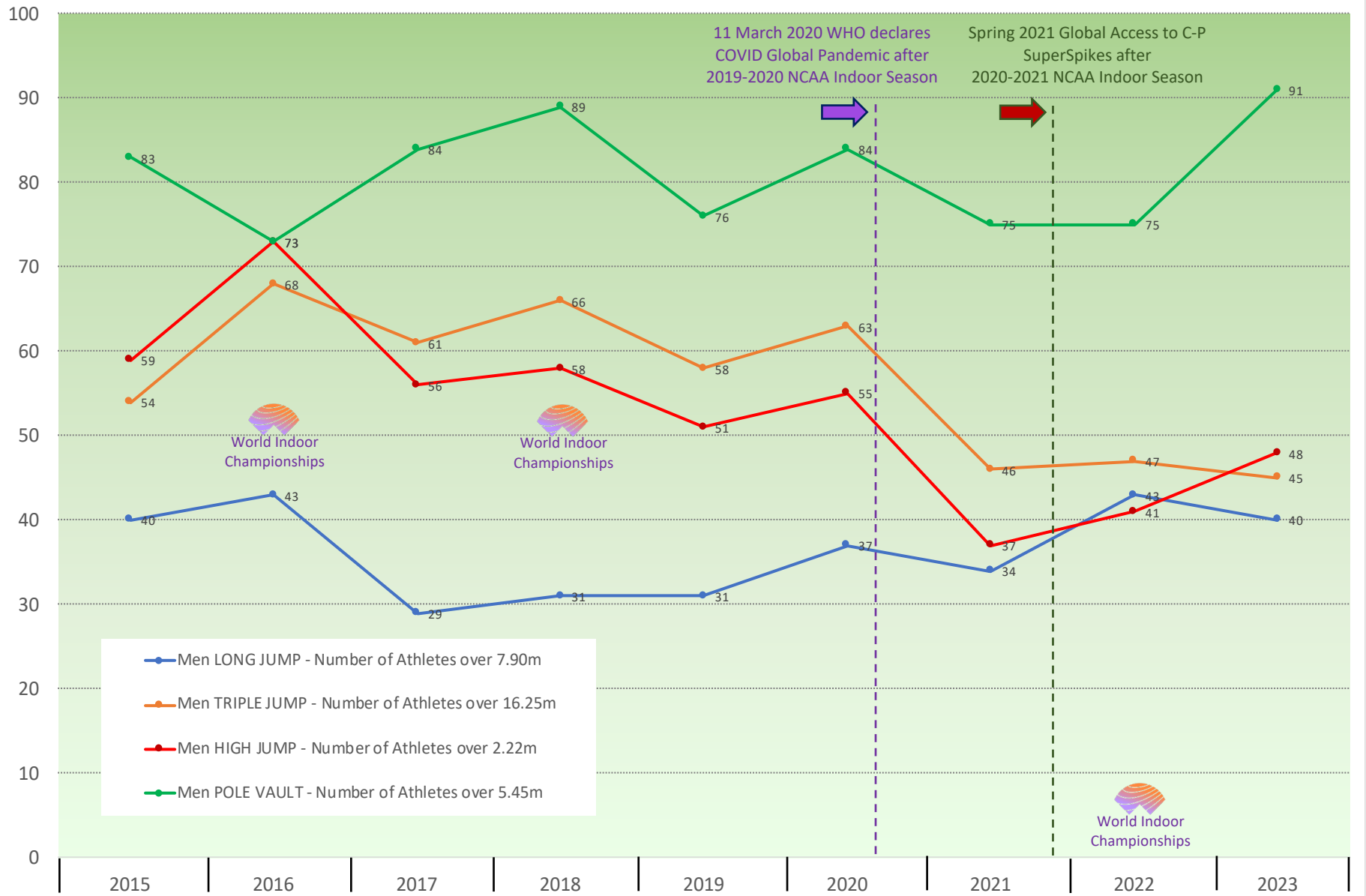
World Athletics Men Indoor SPRINTS & HURDLES Performances 2015-2023



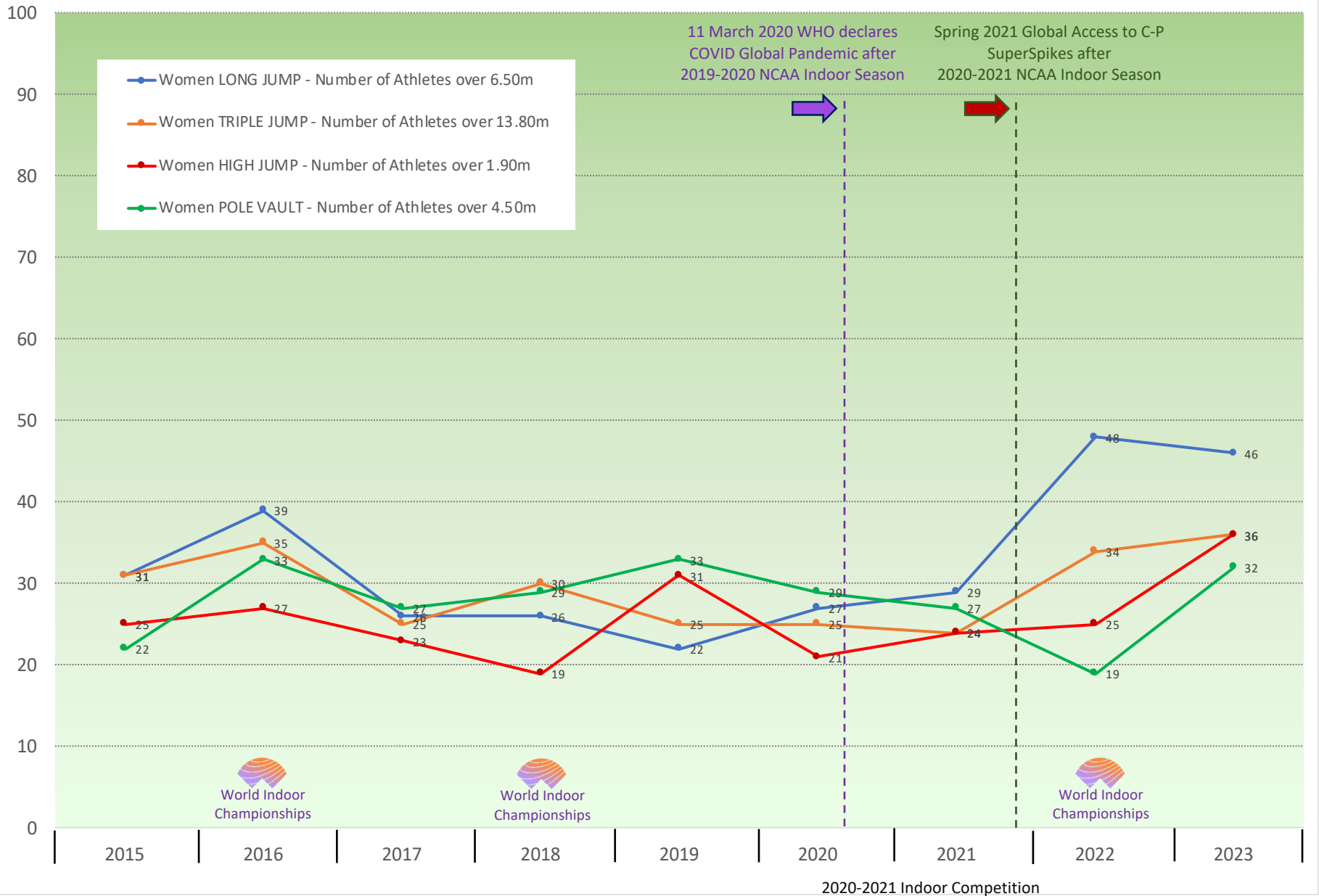
World Athletics Women Indoor SPRINTS & HURDLES Performances 2015-2023



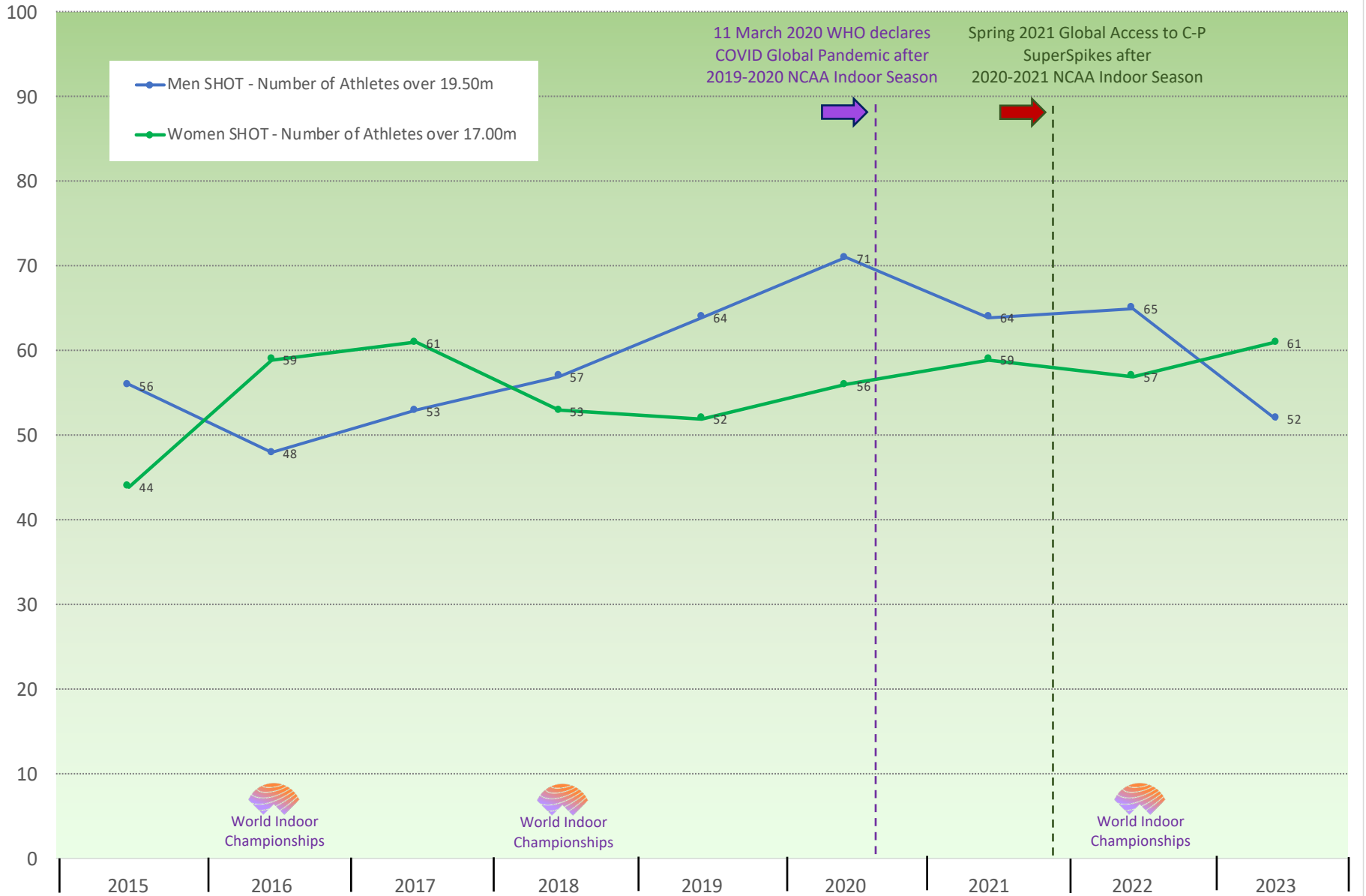
World Athletics Men Indoor JUMPS Performances 2015-2023



World Athletics Women Indoor JUMPS Performances 2015-2023

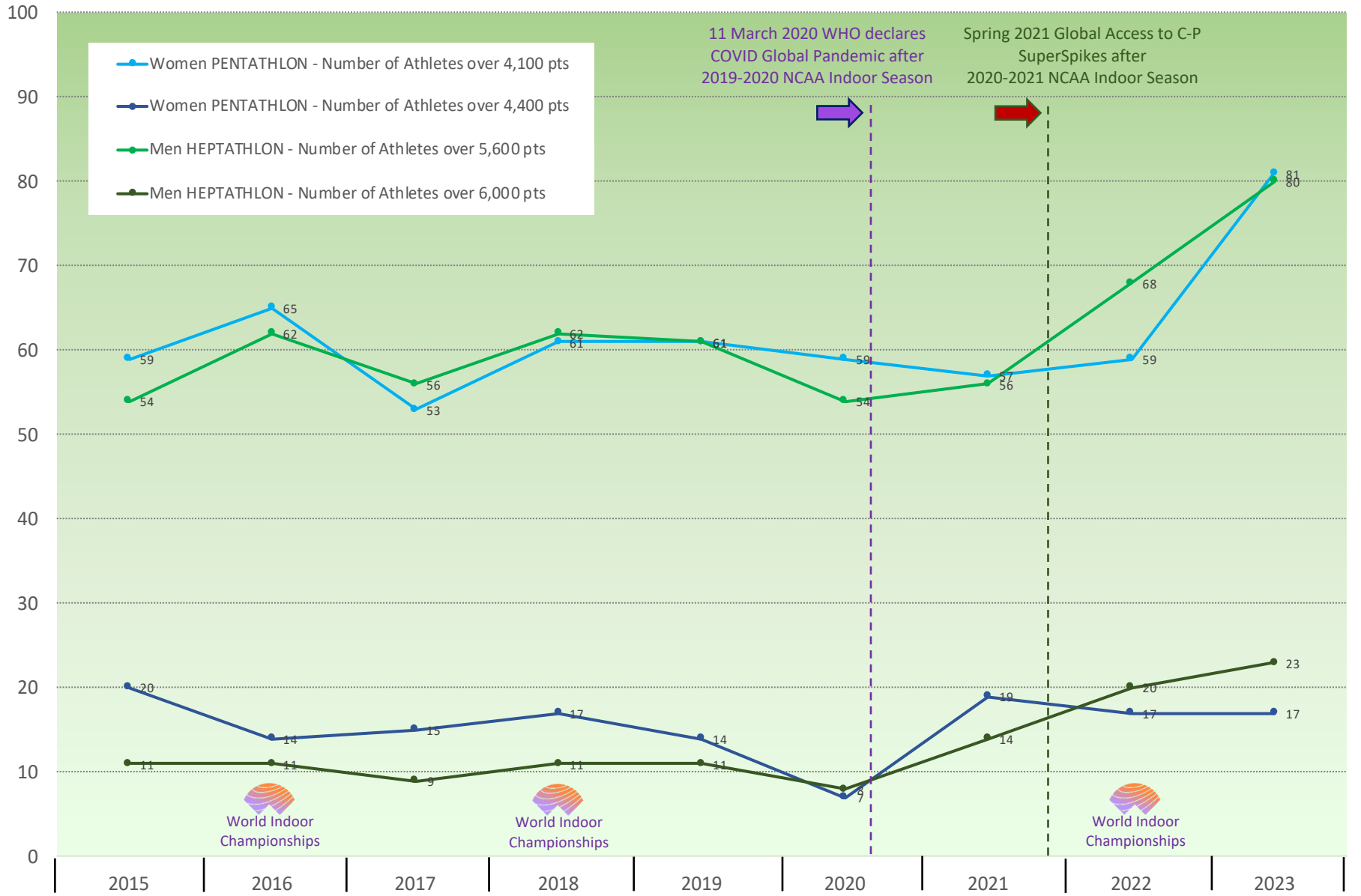


World Athletics Men and Women Indoor SHOT Performances 2015-2023



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

World Athletics Men and Women Indoor COMBINED EVENTS Performances 2015-2023



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

World Athletics Data

World Athletics Data was used in the preparation of this Report

Sourced from the Public Website

<https://worldathletics.org/stats-zone>