Good Afternoon

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Founder/Director

Military Aviator Coalition for Health

"MACH Coalition"

Overview

Our Thanks To Many

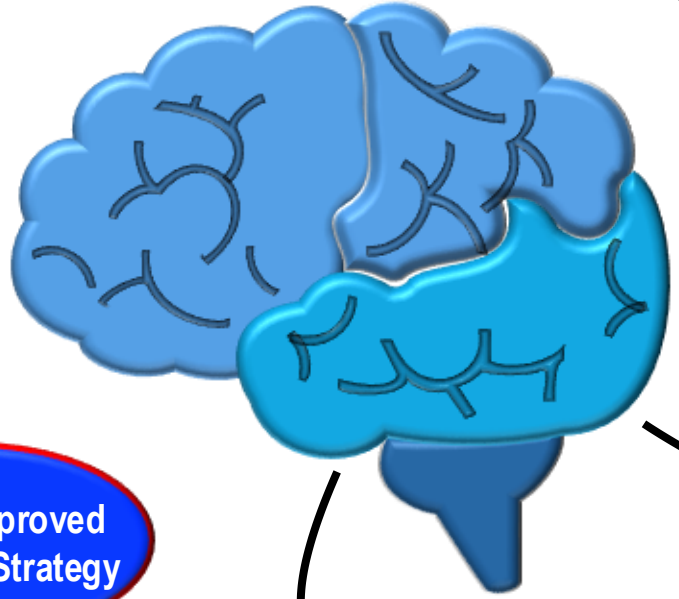
We're *Fixed-wing* Operators…we bring incidence/mortality

1. Look backward…gesture forward

2. Unpack select data depictions

3. Concluding thoughts

Aviator Cancer Mind Map



(2019) "Go Fix Cancer"

(2019) What Are We Doing?

(2020) Problem Statement
"Av Cancer Working Hypothesis"

(2020) Who Do We Work With?

(2022) Av Cancer Strategy

I. Incidence
II. Causation
III. The IOS*

(2026) Improved Outcome Strategy

(2022) FY21 NDAA

(2023) Phase 1A Study

(2024) Phase 1B Study

(2025) Sect. 750 Phase 2* DoD MACS

(2026) NASEM ACES Study Group (VA)

(2021) USAF Service Study + DHA

Navy/USMC DHA Only

Army DHA Only

(2025) FY26 ROTOR Act: DHA Study

ACES vs MACS: Why 2 Studies?

(2026) NASEM ACES Study Group (VA)

(2025) Sect. 750 Phase 2* DoD MACS

- **DoD MACS—Sect. 750 of FY21 NDAA: Phase 2 Study:**
  - *"IF"* significant levels of cancer found in Phase 1A + Phase 1B, then Phase 2 study requirement triggered
  - This is a DoD *only* study…meaning? It has little utility for Veteran care—past precedent
  - DoD's accountability move: identify cancer causes as *they* understand them, then mitigate… *what? when? how?*
  - No public transparency, some details will be disclosed, but we will not know which…Higher Classification

- **VA NASEM Aviator Cancer Examination Study (ACES) Study Group:**
  - Your trigger is public law…That trigger are the 2 DHA Av Cancer Studies and their findings
  - This is VA's study…meaning? It has to do with VA's legal writ pertaining to Vet health—not DoD—past precedent
  - VA's research move + their acknowledgement of what they ultimately must do…MACH puts forward the IOS
  - Full transparency + public engagement where Veterans & Advocates are welcomed…UNCLASS

Comparison: DHA's Phase 1A To Phase 1B

Phase 1A Mortality

All-site aircrew cancer mortality, 1992–2017



- **Observed deaths:** 1,240
- **Expected deaths:** 2,832
- **SMR:** 0.44 (95% CI: 0.41–0.46)
- **Source:** NDI Plus death certificates

Annual death counts were not published; any time-distribution curve is modeled from the reported 2017 cumulative endpoint.

Phase 1B Incidence

Aircrew cancer incidence, 1992–2017



- **Observed cases:** 10,489
- **Expected cases:** 9,158
- **All-site SIR:** 1.15
- **Melanoma:** 1.75
- **Thyroid:** 1.31
- **Prostate:** 1.20
- **Population:** 138,505 aircrew

Phase 1B improved case ascertainment using VA + state cancer registry data.

Sensitivity analysis: most elevated incidence findings depended on inclusion of DMSS case-finding data; melanoma remained elevated after DMSS exclusion.

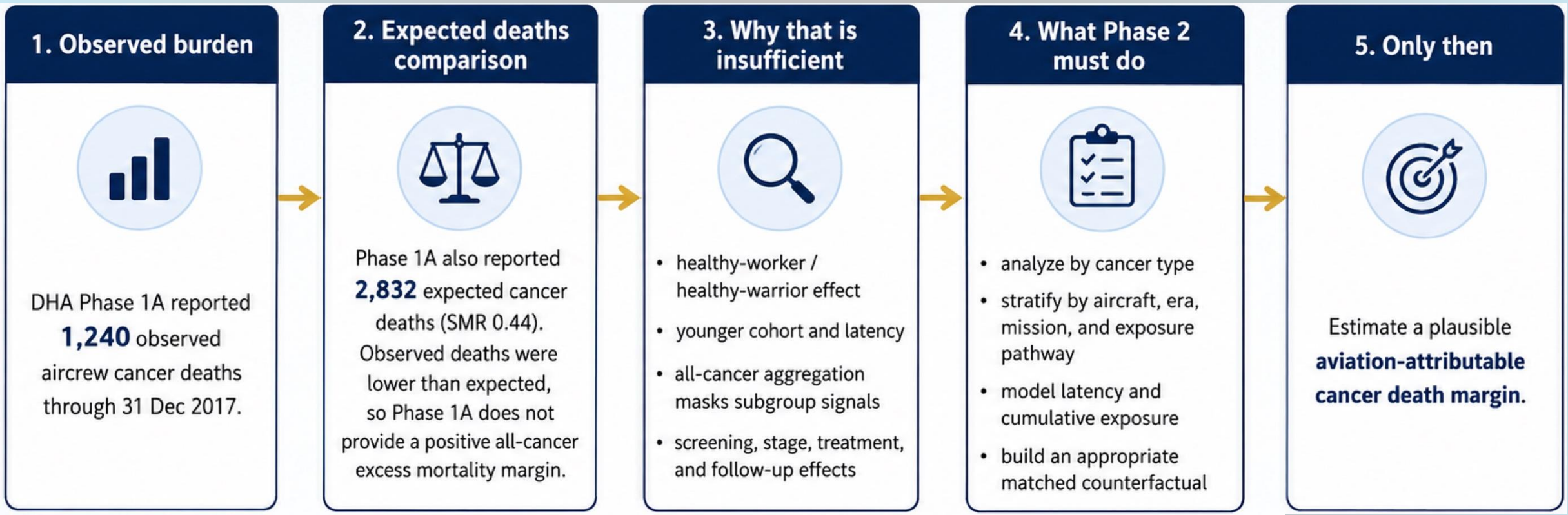
Interpretive Read

- Phase 1A and Phase 1B measured different endpoints: mortality vs. incidence.
- These findings are not contradictory.
- The combination may reflect younger cohort age, screening patterns, stage mix, follow-up time, and case-ascertainment methods.
- Together, the Phase 1 results support Phase 2 inquiry, not a final causal conclusion.

Observed vs. modeled vs. inferred This slide distinguishes reported mortality and incidence results from interpretation.

Sources: DHA Phase 1A Study Report, Table 4 mortality; DHA Phase 1B Study Report, Table 2 aircrew incidence.

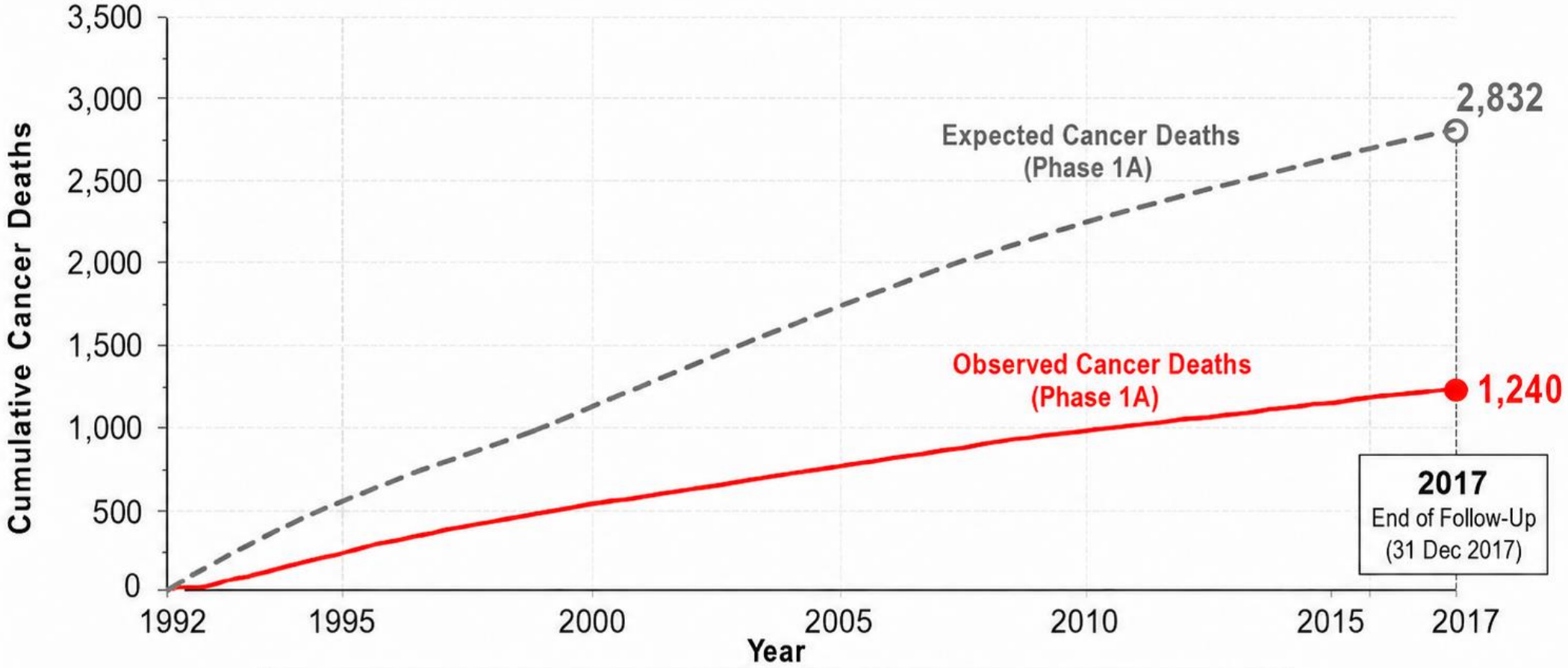
Unpacking the DoD Phase 2 MACS



Caveat 1: 1,240 deaths are a *burden*—Phase 2 is needed to work out deaths

Caveat 2: Cannot subtract deaths from SMR to obtain attributable deaths

DHA Phase 1A: Observed vs Expected Cancer Deaths



Observed Cancer Deaths (Phase 1A): 1,240 *(through 31 Dec 2017)*

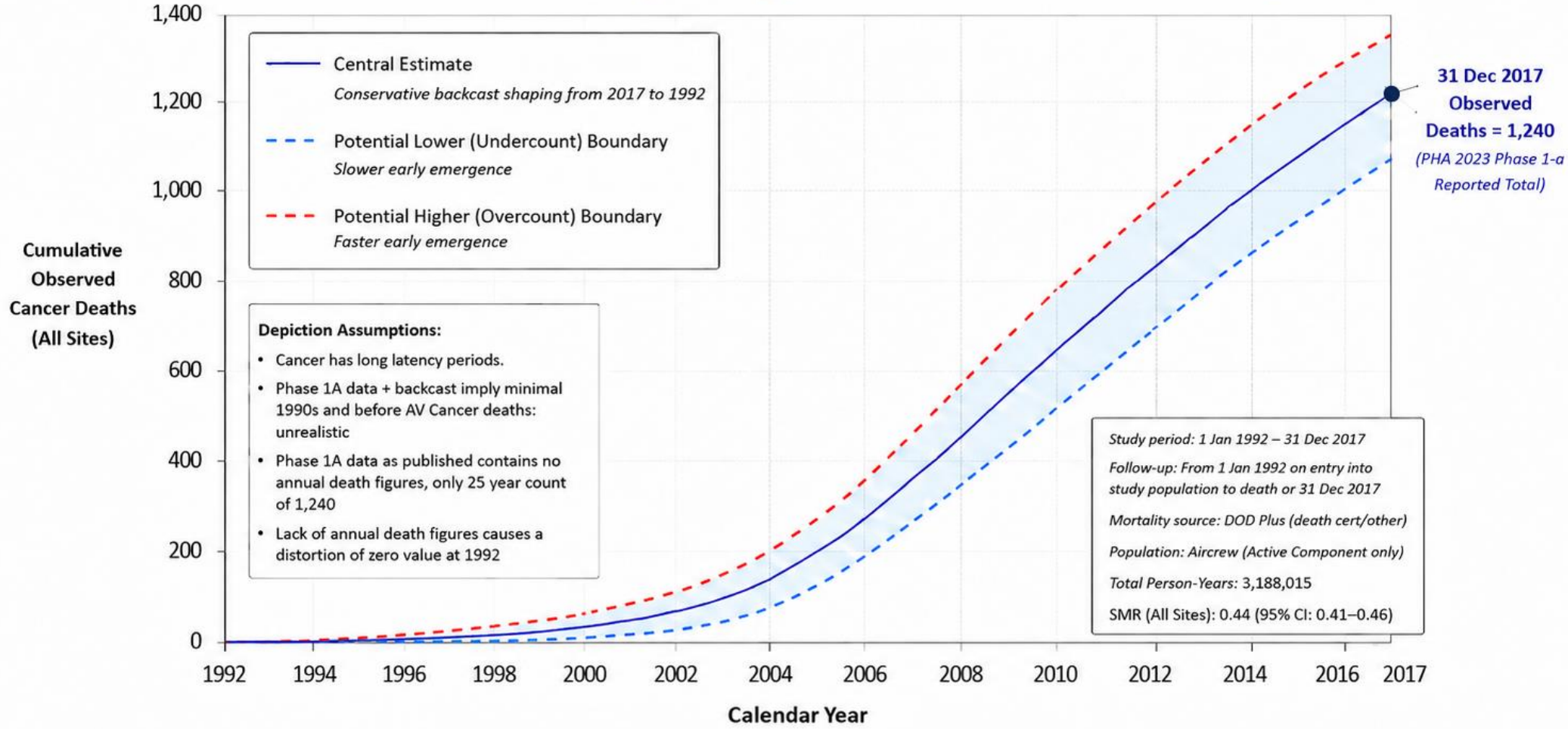
Expected Cancer Deaths (Phase 1A): 2,832 *(through 31 Dec 2017)*

Expected deaths are based on DHA's adjusted comparison cohort.

Source: DHA. "Update: Incidence of Cancer in Aircrew of the U.S. Armed Forces, 1992-2017." Phase 1A Report. April 2023.

Phase 1A 2017 Backcast To 1992

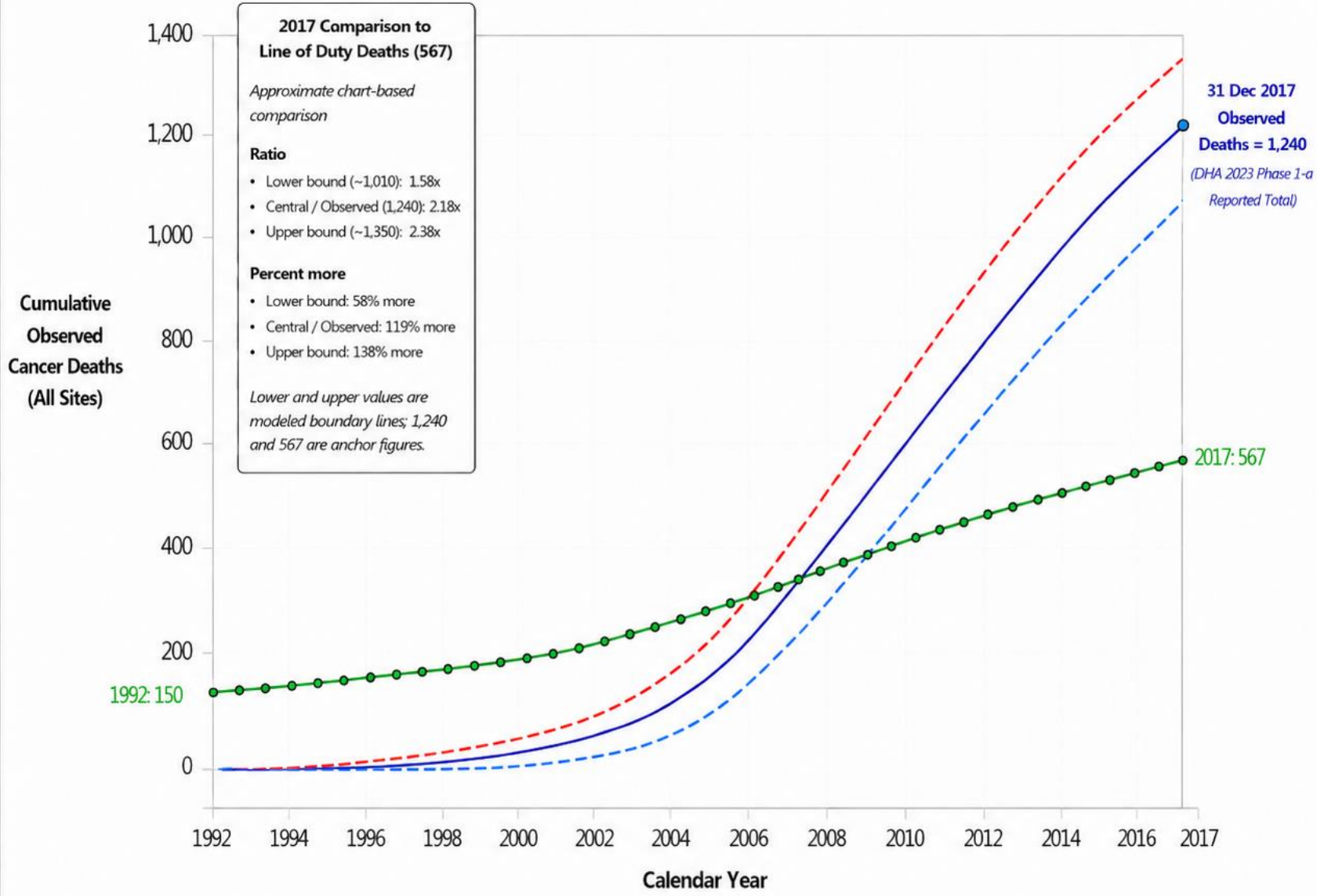
Central Tendency +/- Upper & Lower Count Boundary



Source: **DHA** 2023 Phase 1-a Study Report | Table 4 (Page 18) | Report Period: 1992–2017

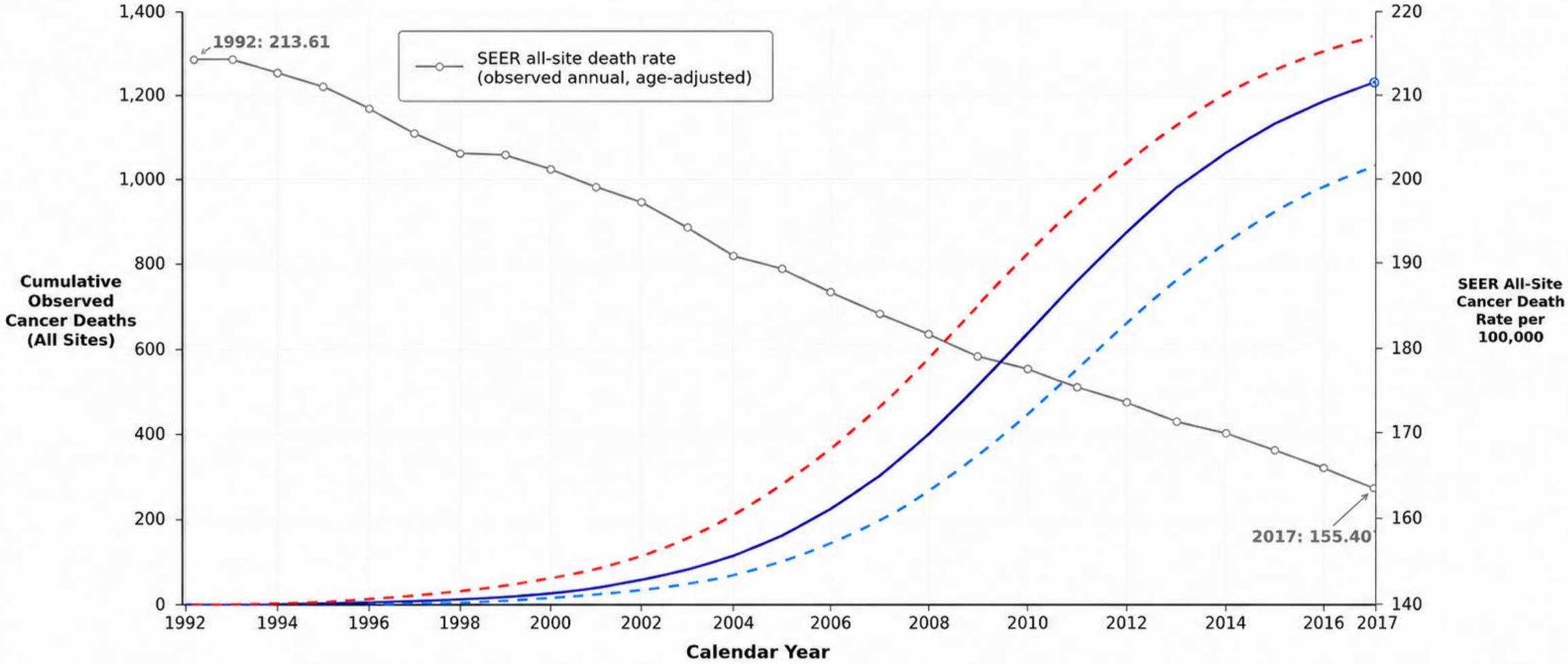
Phase 1A Cancer Burden Backcast vs. DAF/DA/DoN Line of Duty Death Burden

Operational Context: Cost of Doing Business vs. Av Cancer Burden



Source: DHA 2023 Phase 1-a Study Report | Table 4 (Page 18) | Report Period: 1992–2017

Phase 1A Cancer Burden vs SEER Gen. Pop. Cancer Death Trend



Comparison Guardrails

- **SEER series** = U.S. all-site cancer death rate per 100,000 (age-adjusted, observed annual).
- **Military series** = modeled cumulative observed aircrew cancer deaths in a small occupational cohort.
- These are different units and different populations; do not read the two lines as a direct magnitude comparison.
- **Valid use**: directional/contextual contrast, not a formal risk comparison.
- **Why this chart helps**: separate y-axes, explicit labeling, and caveat text reduce misinterpretation.
- **Residual caution**: cohort size, age-structure, and healthy-worker differences still limit direct comparison.

USAF 2021 Av Cancer Study: Airframe & Era

Earlier Study May Sharpen DoD Sec. 750 MACS Questions

1 NARROWER APERTURE



USAF FIGHTER AVIATORS ONLY

- **34,976 fighter aviators**
  out of 386,190 officers
- **Exposure window:**
  1970 – 2004
- **Follow-up:**
  through **2018**
- Compared to:
  other USAF officers and
  U.S. general population

2 MAIN CANCER SIGNAL

SIGNALS OF CONCERN

- **MELANOMA**
- **PROSTATE**
- **NON-HODGKIN LYMPHOMA**

Elevated standardized incidence and mortality versus U.S. population

3 WHY IT MATTERS



AIRFRAME / ERA SIGNAL

F-100 FINDING:
HYPOTHESIS-GENERATING

F-100 aviators had elevated odds of diagnosis and mortality for multiple cancers compared with fighter aviators who never flew the F-100.

SUPPORTS PHASE 2 TAILORING BY:

Aircraft | Era | Mission Exposure Pathway

BOTTOM LINE: The USAF 2021 study does not replace DHA Phase 1A/1B. It sharpens the Phase 2 question: cancer risk should be examined by aircraft, era, mission, and exposure pathway — not only by broad occupational category.

Source: USAF School of Aerospace Medicine (USAFSAM). Cancer Incidence and Mortality in U.S. Air Force Fighter Aviators, 1970–2004. Final Report to the AF/SG (May 2021).

Concluding Thoughts

The ACES law has this study focused on causation…why?
MACH thinks in terms of flying exposures—*documenting them* for the first time in U.S. military aviation history so the VA can design surveillance and when appropriate, best treatment, soonest. Causation data is essential to improved Veteran flyer health outcomes

Your planned Field & Fleet base/port visits: *what you may see…*
You will be well received but, you may find yourself in an interesting educational role…why? 1) Information voids & 2) Silent Chain(s) of Command

DoD has a moral duty to decrease flyer cancer incidence via exposure mitigation. Dissimilarly, the VA's job is to understand how it can better care for ~ 150,000 exposed Veteran flyers with occupational-specific exposures…why? Improve their treatment + mortality outcomes

MACH's perception—subject to confirmation, is that this study group is the first word on flyer cancer causation…*certainly not the final*


MILITARY AVIATOR COALITION FOR HEALTH
M-A-C-H

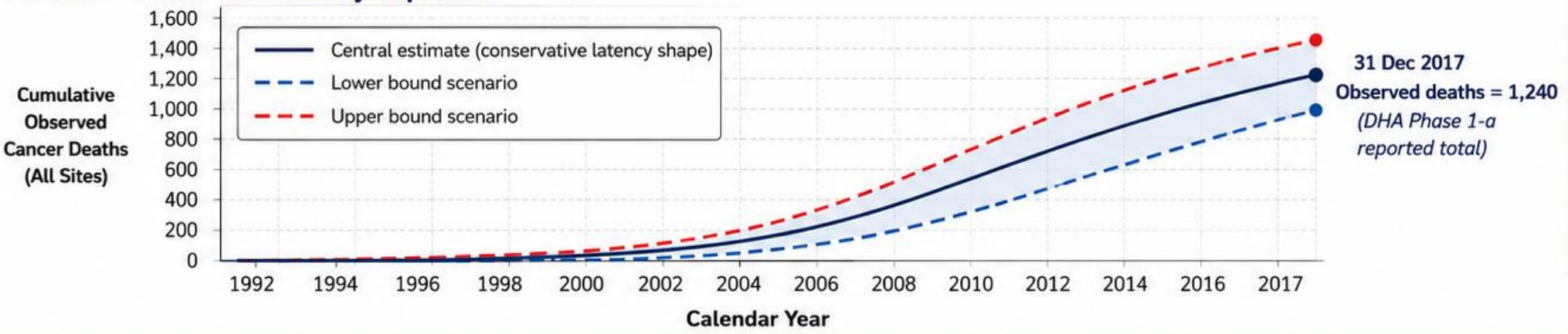
Back Ups

DHA Phase 1 Aircrew Findings: Mortality and Incidence (1992–2017)

Backup slide for interpreting Phase 1A mortality and Phase 1B incidence together

These two panels show different outcomes from different Phase 1 products. Phase 1A reported aircrew mortality; Phase 1B updated aircrew incidence using VA and state registry data. Read as complementary findings, not as directly equivalent measures.

Panel A — Phase 1A Mortality Depiction



31 Dec 2017
Observed deaths = 1,240
(DHA Phase 1-a reported total)

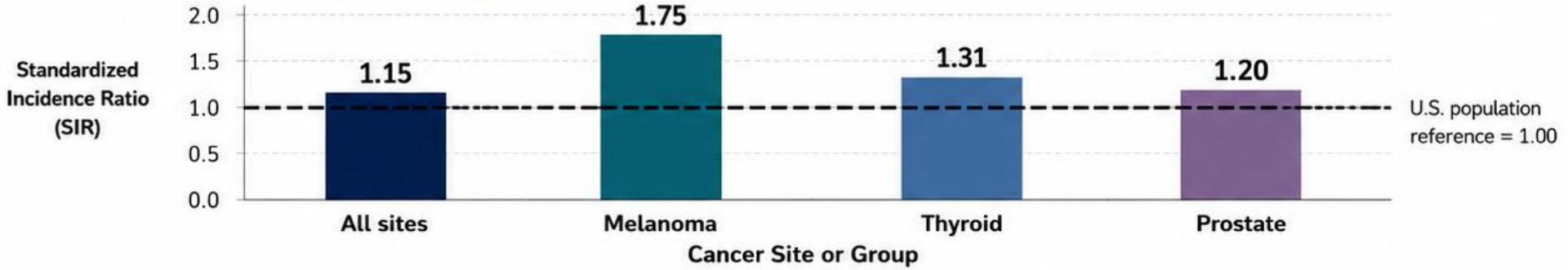
Mortality source: NDI Plus (death certificates)

Person-years: 3,188,015

SMR (all sites): 0.44 (95% CI: 0.41–0.46)

Important: Annual death counts were not published; curves are modeled depictions of the cumulative endpoint.

Panel B — Phase 1B Incidence Findings



U.S. population reference = 1.00

Phase 1B all-site incidence

Observed cases: 10,489

Expected cases: 9,158

All-site SIR: 1.15

Population: 138,505 aircrew

Phase 1B added VA + state cancer registry data

Interpretive Guardrails

- Phase 1A and Phase 1B measure different outcomes: mortality vs. incidence.
- Mortality panel shows modeled cumulative deaths anchored to the reported 2017 total; it is not an observed annual death series.
- Incidence panel shows Phase 1B SIRs after improved case ascertainment using VA and state registry data.
- **Key message:** higher aircrew cancer incidence can coexist with lower observed all-site mortality during the same study era.

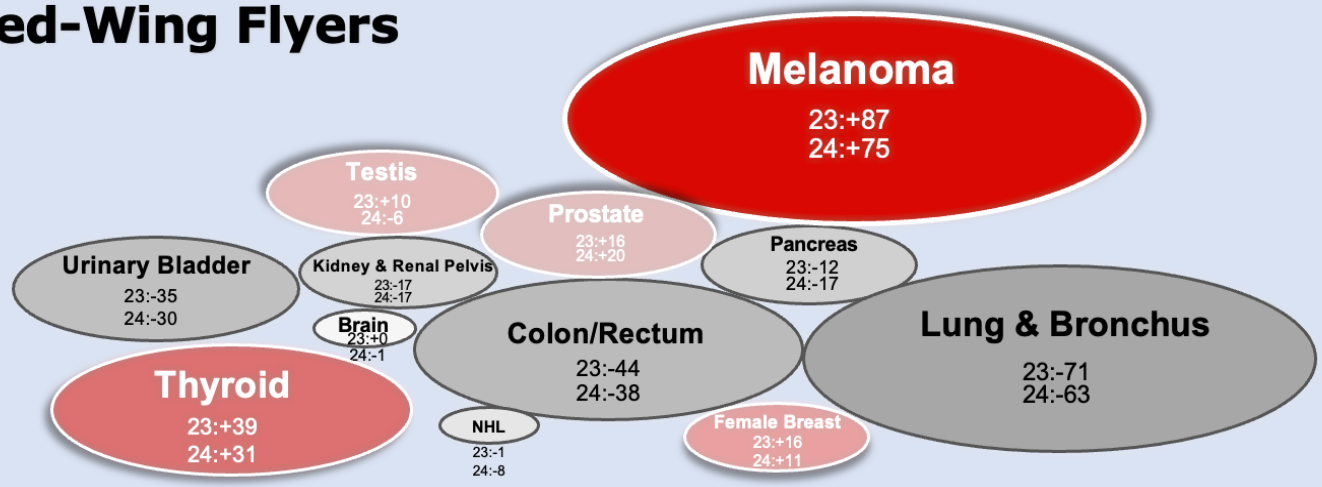
Sources: DHA Phase 1-a Study Report (mortality); DHA Phase 1B Study Report (incidence). | **Backup use:** helpful when discussing why Phase 1A and Phase 1B appear different but are not contradictory.

DHA 2023 & 2024 Aviator Cancer Incidence *Studied* Cancers*

Bubble size = <u>average</u> absolute deviation across the **two** studies • **Red family** = positive average elevation • **Gray family** = negative average deviation

USAF-USN-USMC Fixed-Wing Flyers

23 = 2023 DHA Study
24 = 2024 DHA Study



NHL: Non-Hodgkin Lymphoma

DHA: Defense Health Agency

…how many of those 1,240 deaths would've happened anyhow?"

A: DHA Phase 1A provides a mortality *burden*—not a death count (KIA figure)

For Us, we have another perspective…remember the undercount from slide #6? This is our impact before DOD's Phase 2 Study. *This is what DoD should be talking about…*

DHA PHASE 1A MORTALITY ARITHMETIC

Observed cancer deaths	**1,240**
Expected deaths	**2,832**
Observed minus expected	**−1,592**
SMR (all sites)	**0.44**

Within the Phase 1A adjusted reference frame, observed all-cancer mortality was below expected — not above it.

BOTTOM-LINE ANSWER

0

positive excess death margin

Do not subtract the 1,240 observed deaths to claim aviation-attributable cancer deaths. Phase 1A does not provide that causal counterfactual.

WHAT THIS DOES / DOES NOT SAY

It does say:

- The reported burden was 1,240 observed aircrew cancer deaths by 2017.
- DHA's expected-deaths model predicted more deaths than observed.

It does not say:

- Aviation exposures caused zero cancer deaths.
- Aviation exposures caused all 1,240 deaths.
- The attributable margin can be calculated from Phase 1A alone.

End Back Ups