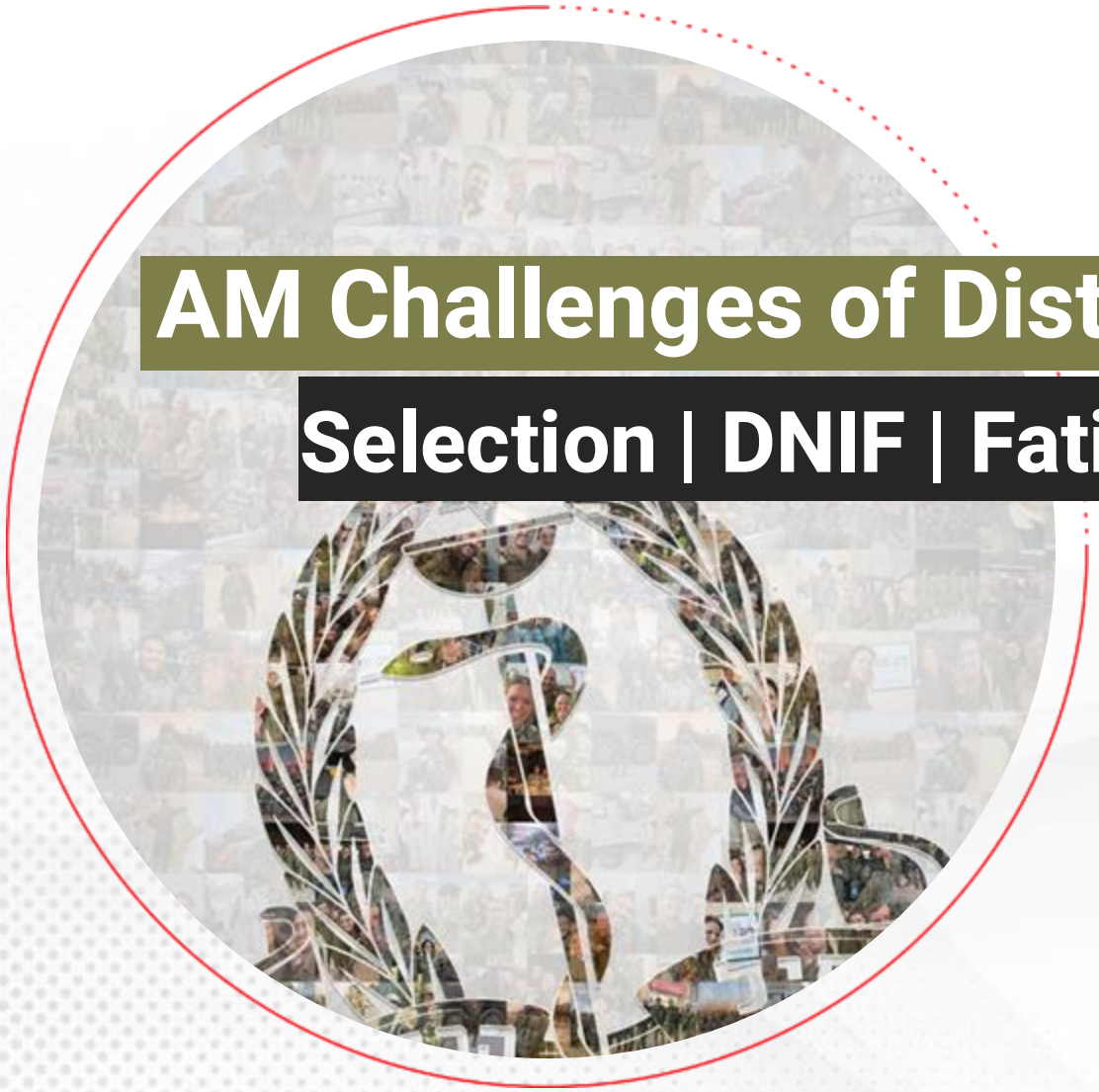


AM Challenges of Distant Warfighting

Selection | DNIF | Fatigue | APT

Ivan GUR

At the moment of truth,
IDF MEDICAL CORPS.

A New Operational Reality

The war in Iran revolutionized the operational environment of the IAF:

explore

Distance

Sorties of 4 to 8 hours, in stark contrast to previous missions lasting only a few minutes.

speed

Tempo

3 to 5 times the intensity of past operations, with aircrews performing 2 to 4 sorties per diem.

flight

Flight Patterns

Predominantly high-altitude, leveled, and highly prolonged flight profiles.

terrain

Terrain & Climate

Challenging mountainous landscapes with severe, localized extremes of intense heat and cold.

A New Operational Need

Aeromedically, this translated into numerous challenges:

person_add

Aircrew Shortage

Broadening selection criteria without compromising flight safety or crew survivability over a 40-year military career.

battery_alert

Fatigue

Going beyond fatigue management (planning, stimulants, sleep logistics) to actively measuring and monitoring it.

healing

Prolonged Flight

Addressing high-altitude issues (barotrauma, pressure ulcers, backache) and adapting a more lenient DNIF policy.

terrain

Extraction & SGOs

Mitigating high-altitude extraction risks and implementing SGO protocols with a focus on AMS prevention.

Pilot Candidate Selection - Pulmonology

shield

The Mandate

The Need: Minimize candidate risk for the subsequent 4 decades, keeping in mind pressure changes (including explosive decompression) and potential SERE scenarios.

The Method: Screening via self-reported history and resting spirometry.

history

Historical Standards

Spirometry: Any FEV1/FVC < 0.8 is immediately disqualifying.

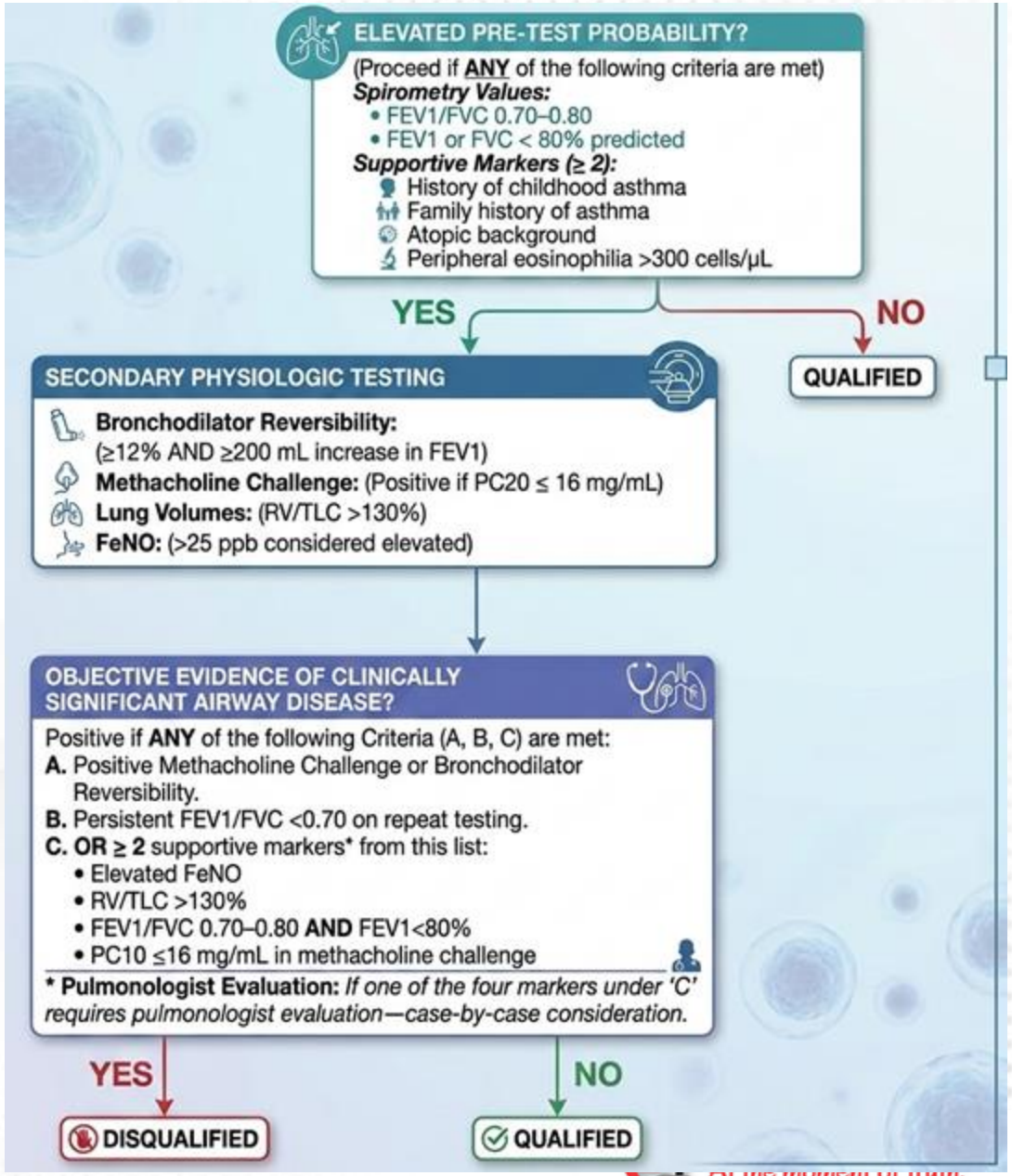
Medical History: Any clinical history (ever wheezing, one-time bronchodilator use, etc.) after the age of 12 is theoretically disqualifying.

gavel

Clinical Reality

Subjective Decisions: Despite highly rigid historical guidelines, in practice, the final selection is highly dependent on the assessment and discretion of the specific flight surgeon.

Pulmonology - Delphy Consensus adapted Universal Protocol



Reduction in Disqualified Candidates

Pre-Policy Implementation (Historical Standards)

NEW POLICY ADOPTED

Post-Policy Implementation (New Delphy Consensus)

Implementation of the Pulmonology Delphy Consensus led to to a significant decrease in the disqualification rate.

Rethinking AM selection

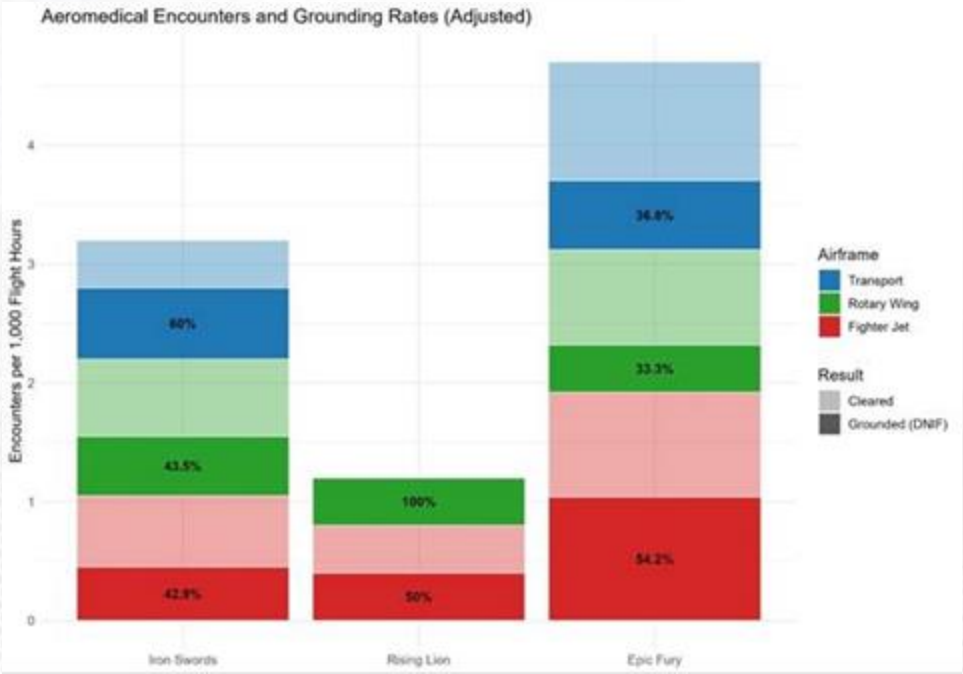
18%
Total Candidate Disqualifications

- **Ophthalmological Conditions (55.0%)**
  - Visual acuity impairment (57.4%)
  - Refractive error (14.5%)
  - Phoria (8.7%)
  - Color vision defects (7.6%)
- **Asthma (7.9%)**
  - Pathological spirometry (70.3%)
  - Active disease within 5 years (22.5%)
  - Hyperreactivity (12.4%)
- **Allergic Rhinitis (7.3%)**
  - Risk factor for barotitis (60.4%)
  - High clinical risk (27.1%)
- **Renal & Urinary Conditions (5.2%)**
  - Asymptomatic hematuria (66.7%)
  - Proteinuria (18.5%)
- **Otolaryngological (ENT) (5.2%)**
  - Hearing impairment (63.0%)
  - Anatomical ear abnormalities (25.9%)
- **Cardiovascular (4.4%)**
  - Syncope history (47.8%)
  - Hypertension (26.1%)
  - WPW syndrome (17.4%)
- **Neuropsychiatric (2.7%)**
  - Migraines (78.6%)
- **Orthopedic (2.7%)**
  - Knee (28.6%)
  - Back (21.4%)
  - Shoulder (14.3%)
  - Ankle (14.3%)
- **Other / Systemic (5.2%)**
  - Dermatological conditions (42.9%)
  - Food allergies (17.9%)
  - Non-asthma pulmonary (14.3%)

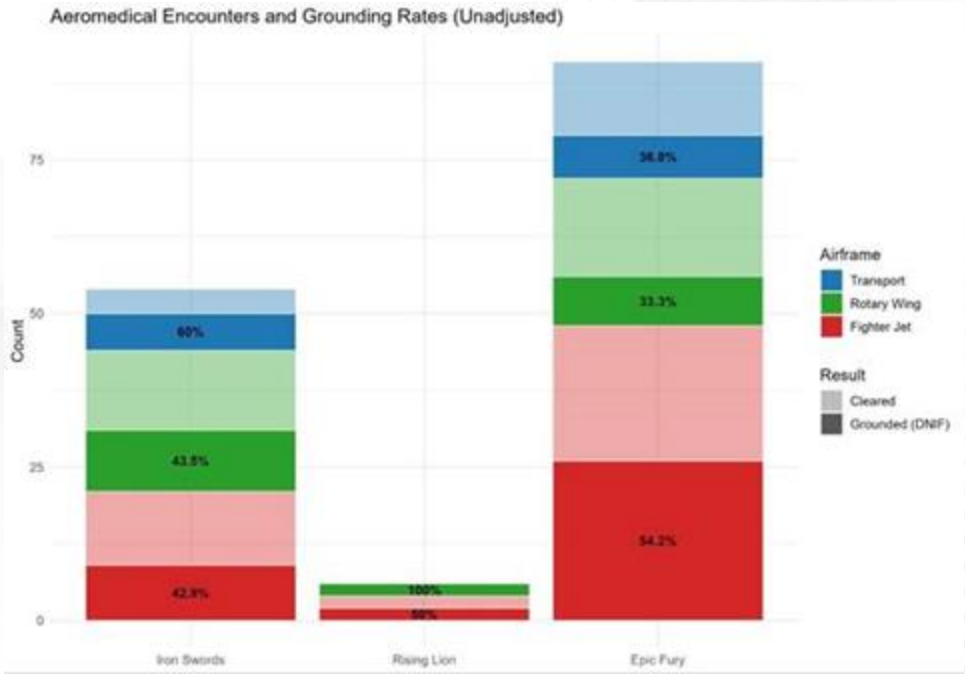
Who Goes to See the Flight Surgeon?

Aeromedical encounters increased primarily in **Transport** and **Fighter Jets**. However, this did not translate to more groundings: Transport experienced **fewer groundings (DNIF)**, while Fighter Jets showed **no proportional increase**.

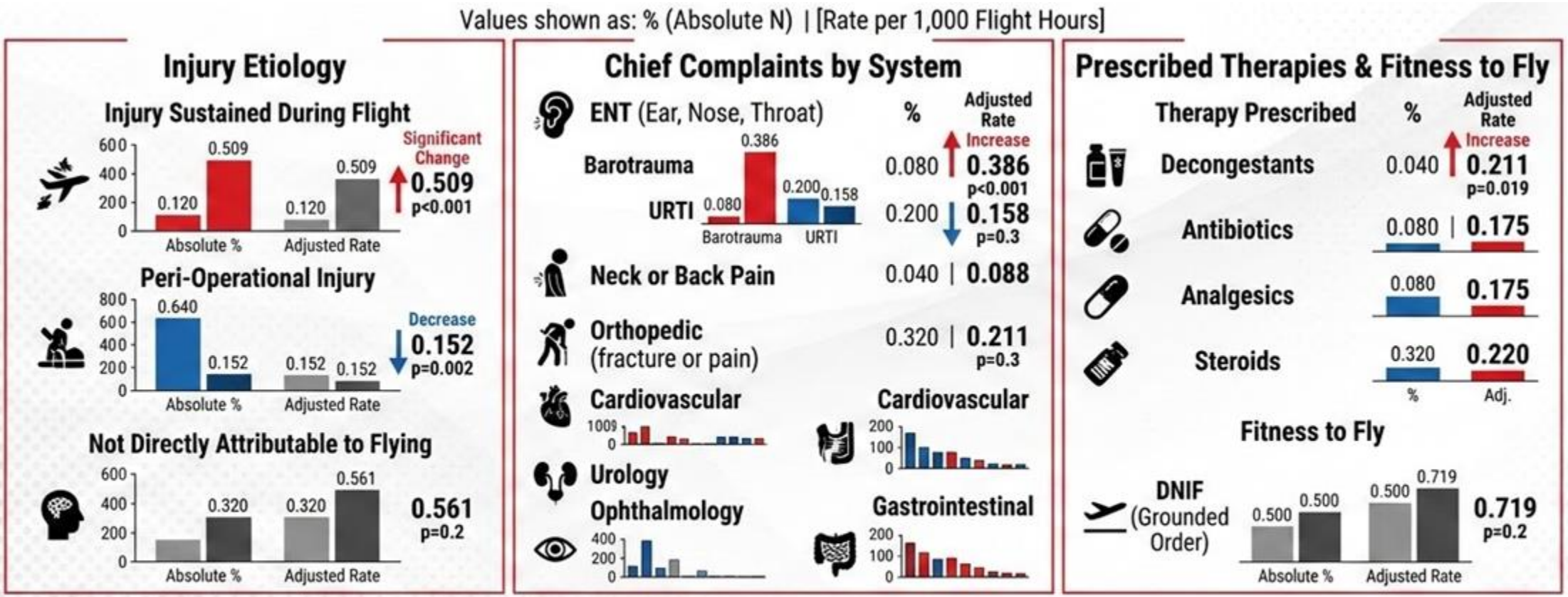
Adjusted Rate (per 1,000 Flight Hours) — Proportion of DNIF



Absolute Count (Unadjusted) — Total Encounters



Why Go see the Flight surgeon



What happens when you go see a flight surgeon

flight related injuries were more prevalent and increased the risk (x2.26) for DNIF only in Epic Fury.

Characteristic	Iron Swords			Epic Fury		
	OR	95% CI	p-value	OR	95% CI	p-value
Age	1.01	0.94, 1.09	0.8	1.06	0.92, 1.13	0.76
Flight-related Injury	0.54	0.05, 5.46	0.6	2.26	1.07, 7.32	**0.02**
Not directly attributable to flight	0.34	0.06, 0.64	**0.002**	0.36	0.17, 0.73	**0.006**
Barotrauma	0.23	0.01, 3.78	0.3	2.70	1.13, 6.80	**0.028**
Treated with antibiotics	3.27	1.03, 9.82	**0.046**	4.74	1.73, 15.2	**0.004**

Why is that?

KEY OPERATIONAL CHALLENGES

01. Mission Duration
Extremely long flights causing prolonged physical wear.

02. Flying Altitude
Continuous mask usage required, causing skin pressure sores and dry gas (sinusitis?).

03. Stress Factors
High-intensity operations compounding physical strain.

FATIGUE

The primary driver of reduced operational tolerance.

Fatigue - planning

From general guidance to aircrew-specific personal schedule

01

General Guidance

Establish standardized military protocols and broad endurance recommendations across units.

02

Personalized Schedule

Tailor specific fatigue-mitigation planning directly to aircrew physiological needs and shift rotations.

Fatigue - pharmacology

Improved SOP & Statutory Easing

Optimizing standard operating procedures and easing regulations to make stimulants:

01

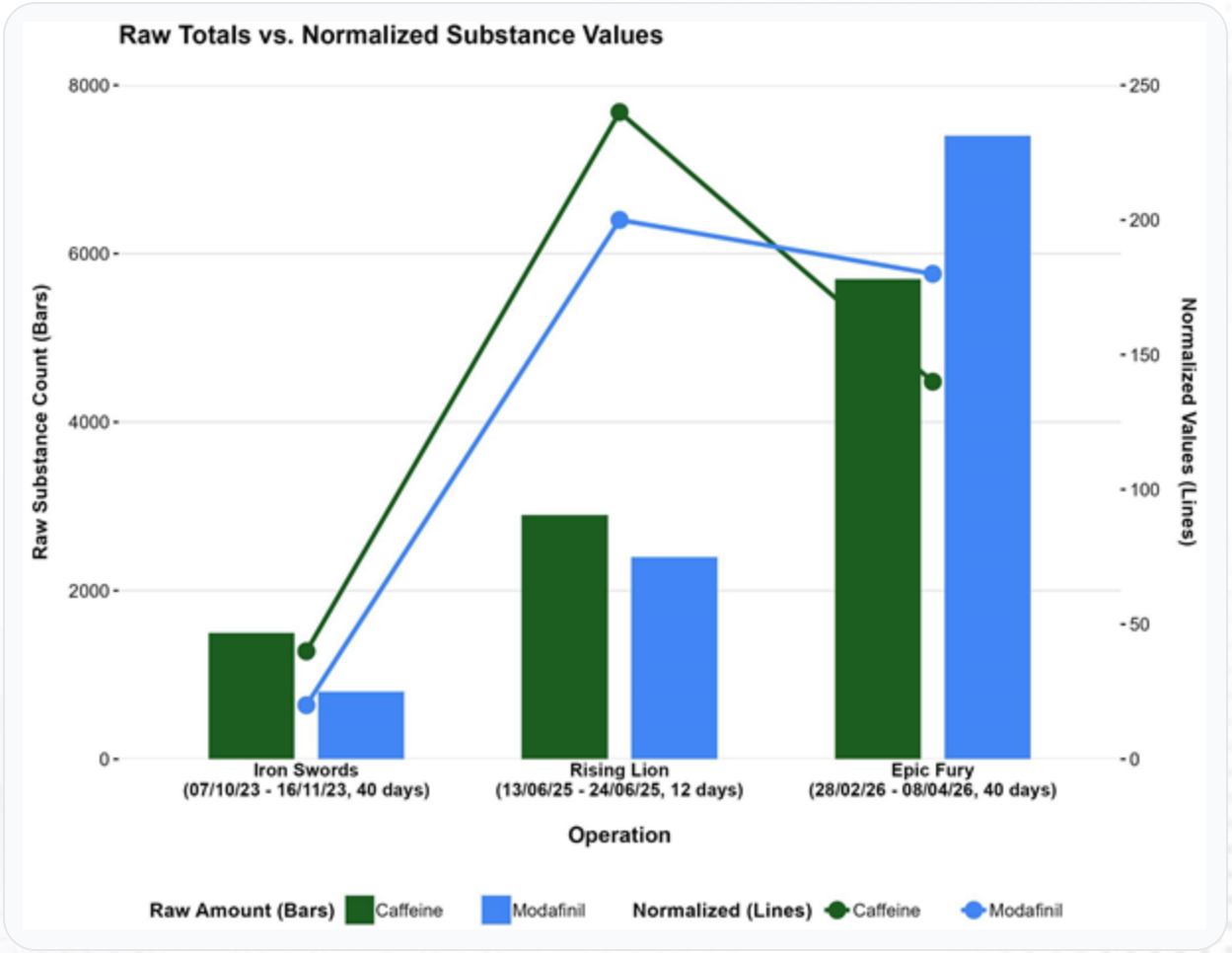
Easier to Distribute & Implement

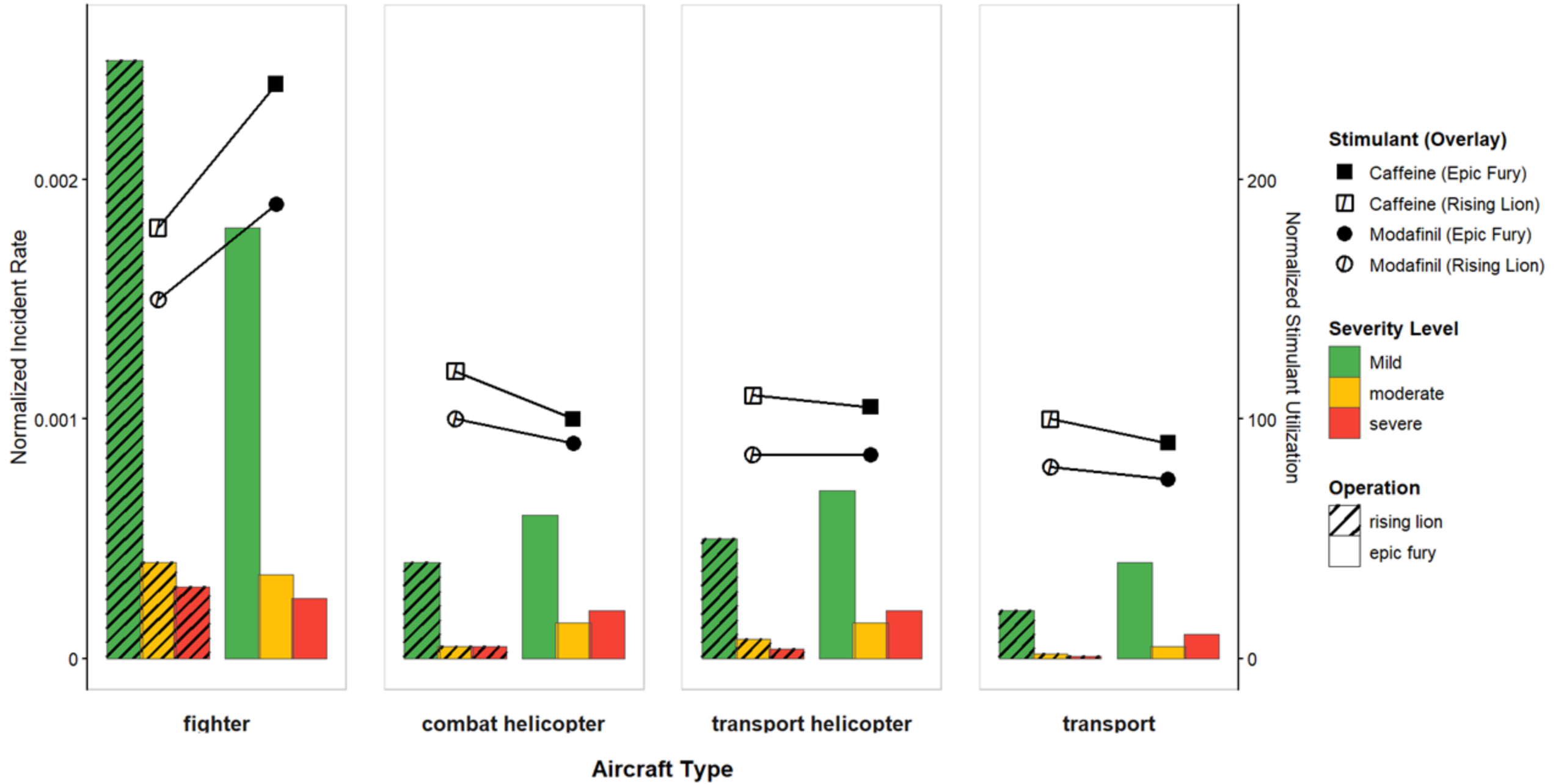
Streamlining deployment pathways and operational logistics for rapid access.

02

More Acceptable

Cultivating broader organizational acceptance and reducing administrative barriers.




Normalized Incident Rate
0.002
0.001
0
Normalized Stimulant Utilization
200
100
0
fighter
combat helicopter
transport helicopter
transport
Aircraft Type
Stimulant (Overlay)
Caffeine (Epic Fury)
Caffeine (Rising Lion)
Modafinil (Epic Fury)
Modafinil (Rising Lion)
Severity Level
Mild
moderate
severe
Operation
rising lion
epic fury

Fatigue - detection

The Quantification Imperative

With modern operational demands, pilot fatigue is an inevitable risk. To protect lives and assets, we must transition from subjective evaluation to objective, data-driven quantification.

> ***"Everybody is going to be too tired to fly safely."***
>
> **Therefore, a tool to quantify fatigue is urgently needed.**

Current Approaches & Limitations

01

SAFE System

Cumbersome to administer in operational environments and highly unreliable at critical levels of flight fatigue.

02

Subjective Reporting

Relying strictly on "asking the pilot" is highly subjective, prone to self-reporting bias, and demonstratively unreliable.

Err Force

Combining biometrics and cognitive assessment to quantify fatigue

- **Flying Task**
- **Eye Tracking**
- **Voice Analysis**
- **Heart Rate Variability**

Err Force

System Requirements

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Easy to Deploy

Simple, straightforward deployment in any operational squadron environment.

Rapid Assessment

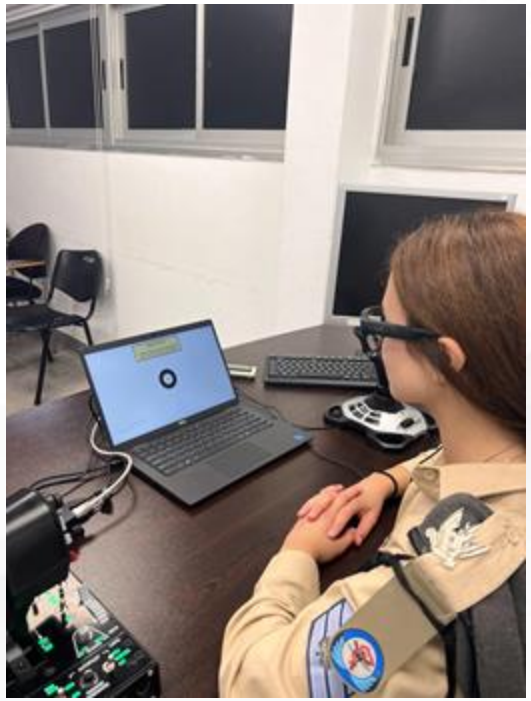
Requires less than 5 minutes of total assessment time per session.

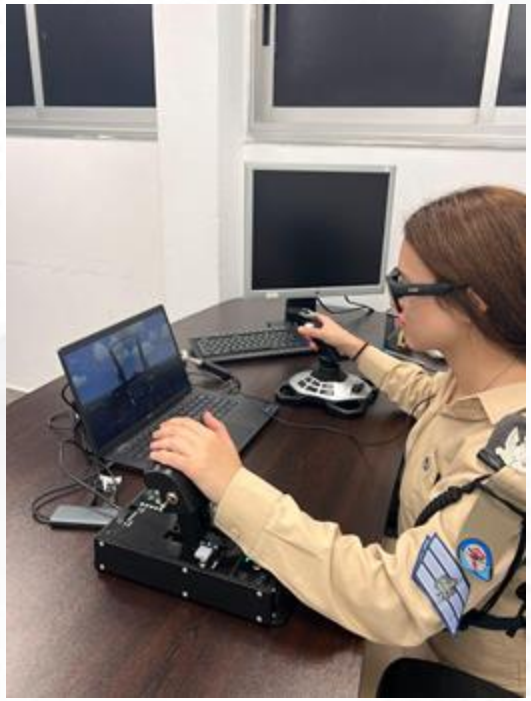
Task Specific

Directly targeted and designed specifically around flying and piloting tasks.

Resistant to Training

Not (very) amenable to learning curves or training effects over time.





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Other Issues - Backpain

Squadron Physiotherapy

Physiotherapy deployed at the squadron around the clock to support aircrew and address active backpain issues.

Flight Material & Guidance

Guidance issued to all aircrew and actively included in the flight material.

Other Issues - SD

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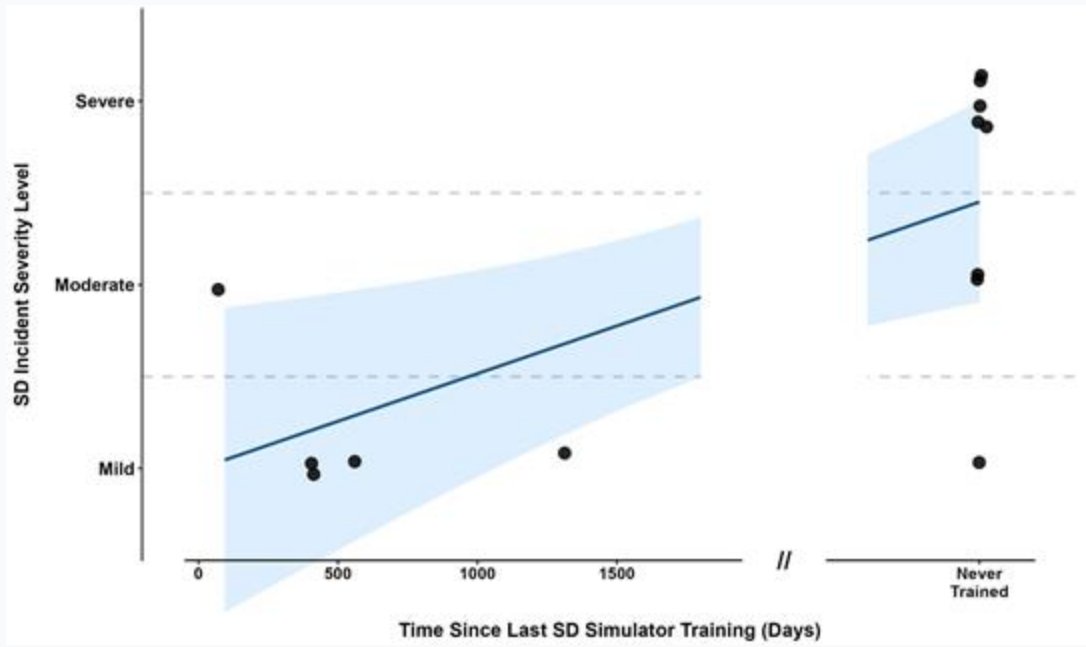
Training Effectiveness

Spatial disorientation training seemed to be critical in reducing the severity of SD related safety incidents during operational flight.



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THANK YOU

At the moment of truth,
IDF MEDICAL CORPS.