

# What Laser Vision Correction Means to the Military...

**Soldiers, Sailors, Airmen, Marines**

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# Standard Disclaimer

- The presenter has no financial or proprietary interest in any material or method mentioned.
- The views expressed in this presentation are those of the presenter and do not necessarily reflect the official policy or position of the Department of the Navy, Department of Defense, nor the U.S. Government.

# Military's Demanding Visual Requirements

- Aviation
  - High performance flight
  - Aircraft carrier landing
  - Unique optical devices
- Special Operations
  - Diving
  - Parachuting
- Night vision devices
- Weapons scopes
- Chemical / biological personal protective gear



# Utility / Impact of Laser Vision Correction

- Improved functional vision
- Contact lens wear actually prohibited while deployed to Iraq, Afghanistan and Korea
- Lower risk for casualties



# Lower risk of casualty with LASIK vs contact lens wear

- From Oliver Schein, MD, MPH of Johns Hopkins University's School of Medicine

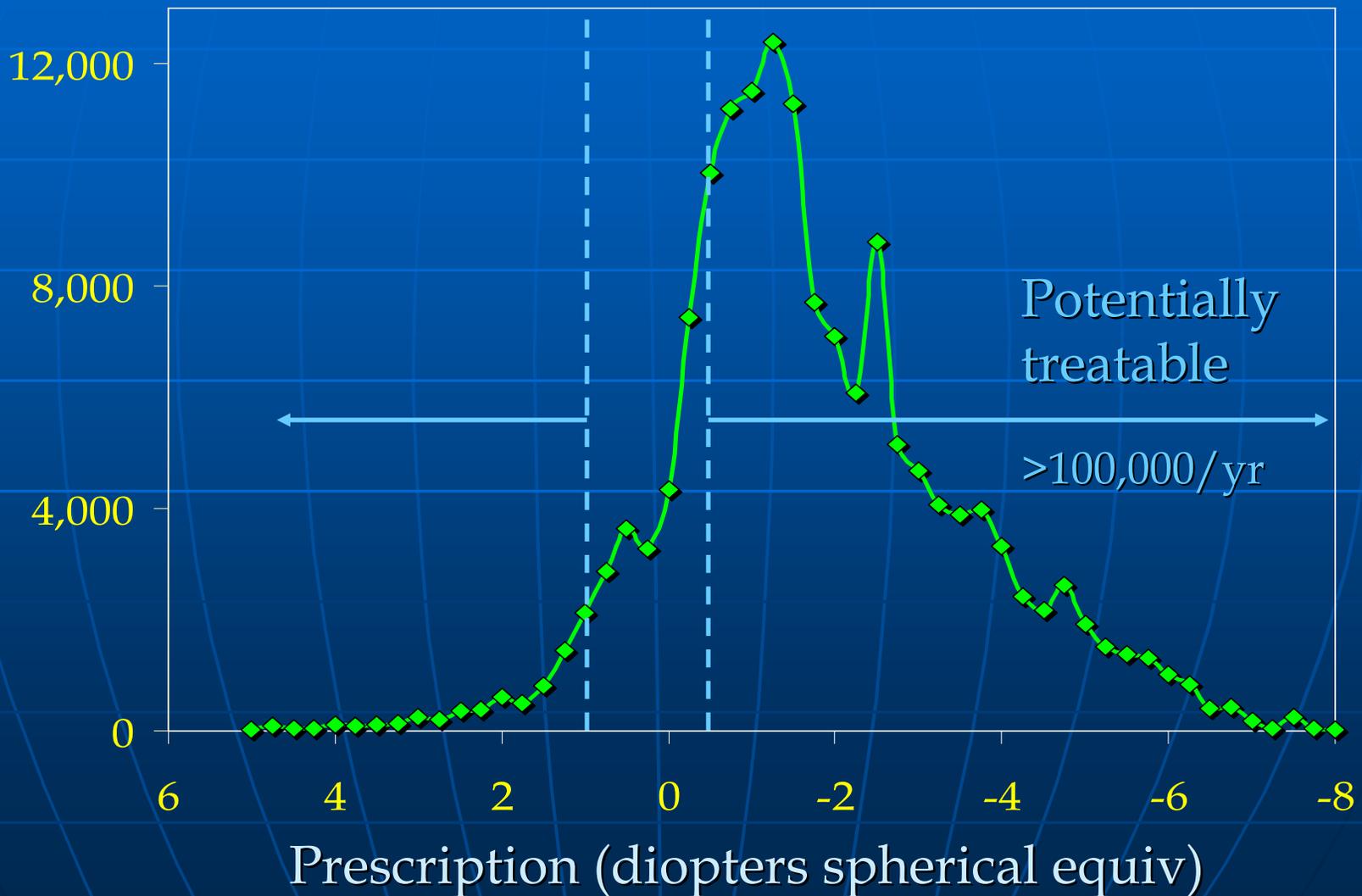
(Arch Ophthalmol. 2007 Jun; 125(6):853-4):

- Cumulative annual risk of infection with contact lens wear is 18/10,000 (0.18%).
- Cumulative annual risk of infection following LASIK is 1/2,000 (0.05%).
- Therefore, the risk of infection is 180 X greater with contact lenses than with LASIK over the course of a lifetime.

- From the ASCRS Cornea Clinical Committee:

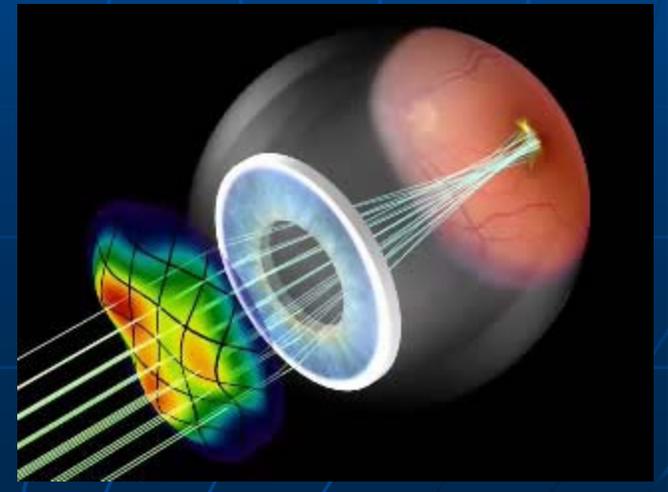
- In 2007, there were 2 cornea transplants for infection following LASIK vs 55 transplants for infections related to contact lens wear.

# Yearly Spectacle Requirement



# Laser Vision Correction Research / Clinical Trials Conducted in the Military

- 45 studies performed to date
  - 15 under Investigational Device Exemption (IDE)
- Goal is **independent evaluation** of LVC
  - Specific issues addressed by military research:
    - Quality of vision
    - Visual recovery
    - Environmental issues related to LVC
      - Aviation
      - Diving
      - Special Operations
    - Expanded parameters of LVC
    - Latest technology



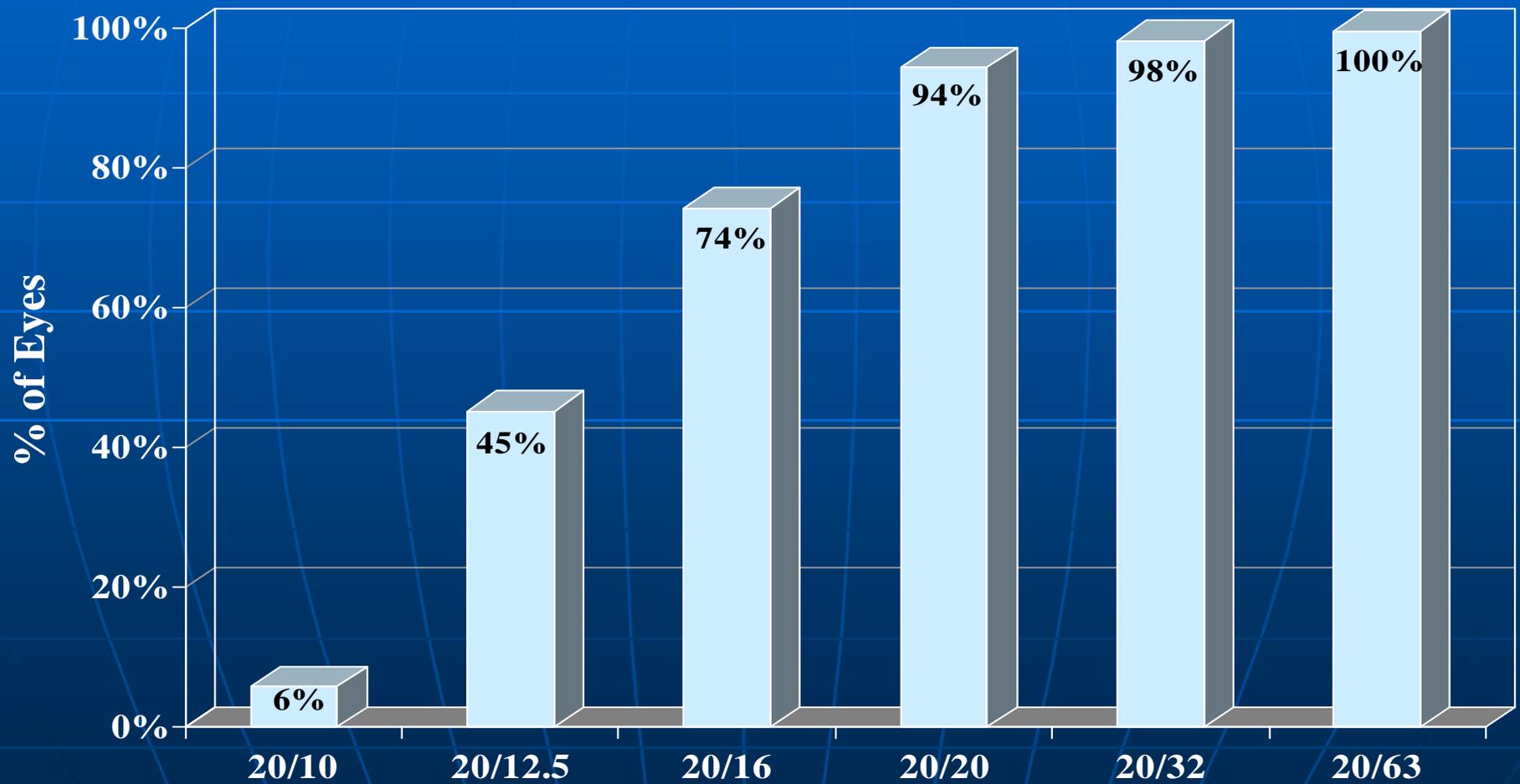
# Results of Studies

- PRK in Naval Aviator Study
  - $n = 785$  aviators
- Laser Comparative LASIK Study
  - $n = 480$  patients
- Satisfaction analysis
  - $n = 1,200$  patients
- Night Driving Study
  - $n = 21$  patients
- LASIK Flap Stability Study
- LASIK in Naval Aviator Study
  - $n = 30$  aviators

# PRK in Naval Aviation

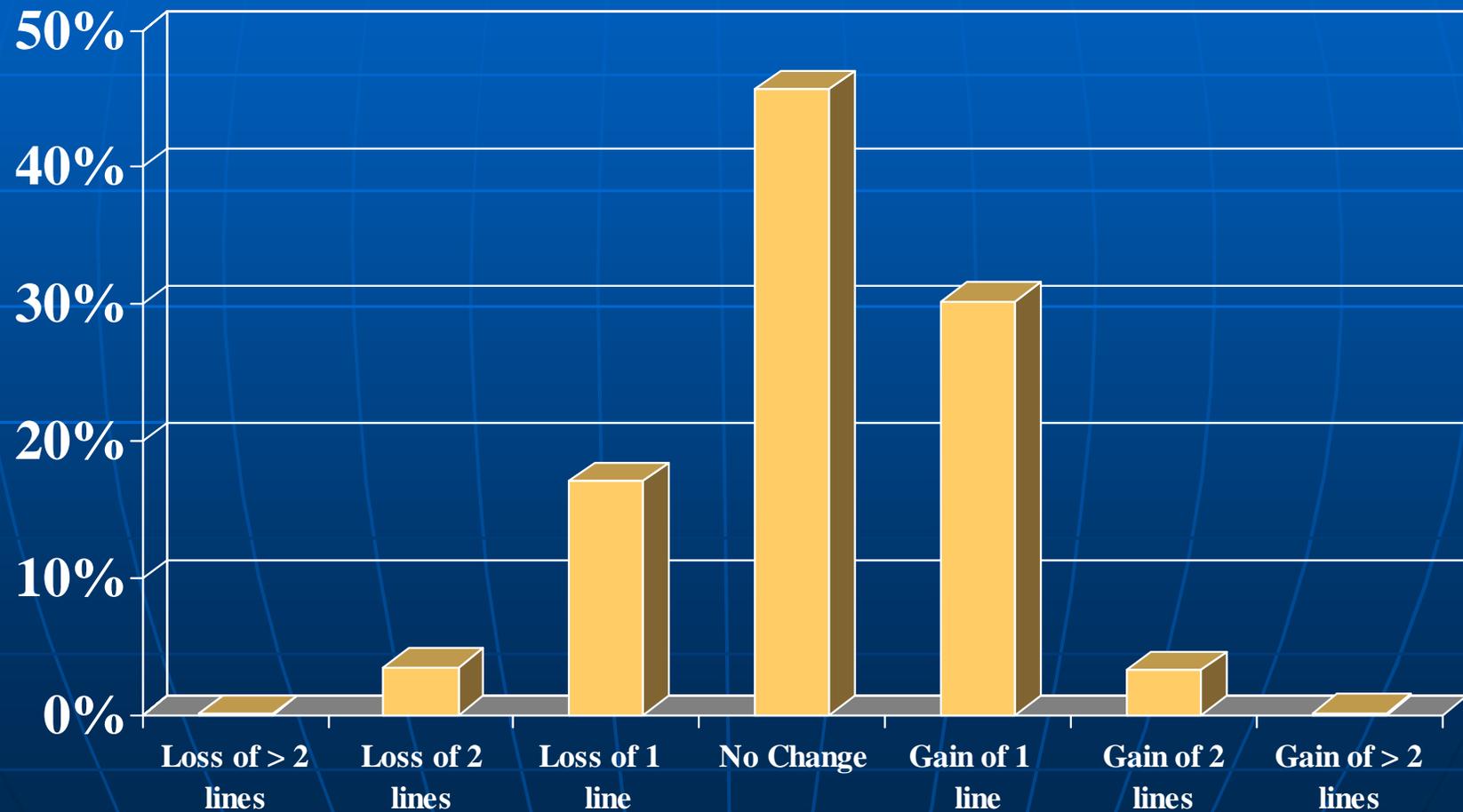
## Uncorrected Visual Acuity - 6 months

(n = 785 aviators)



# PRK in Naval Aviation

Change in Best-Corrected Visual Acuity - 6 months  
(n = 785 aviators)



# PRK in Naval Aviators

## Summary of Complications

- Corneal erosion – single case
  - Incidence 0.1%
- Late Haze
  - visually significant
    - 7 eyes of 4 aviators
      - temporarily not correctable to 20/20
      - quality of vision complaints
  - Incidence 0.5%
- Scar – single case
  - Corneal infection following PRK
  - Loss of best-corrected vision to 20/32
  - Returned to full flight status
  - Incidence 0.1%

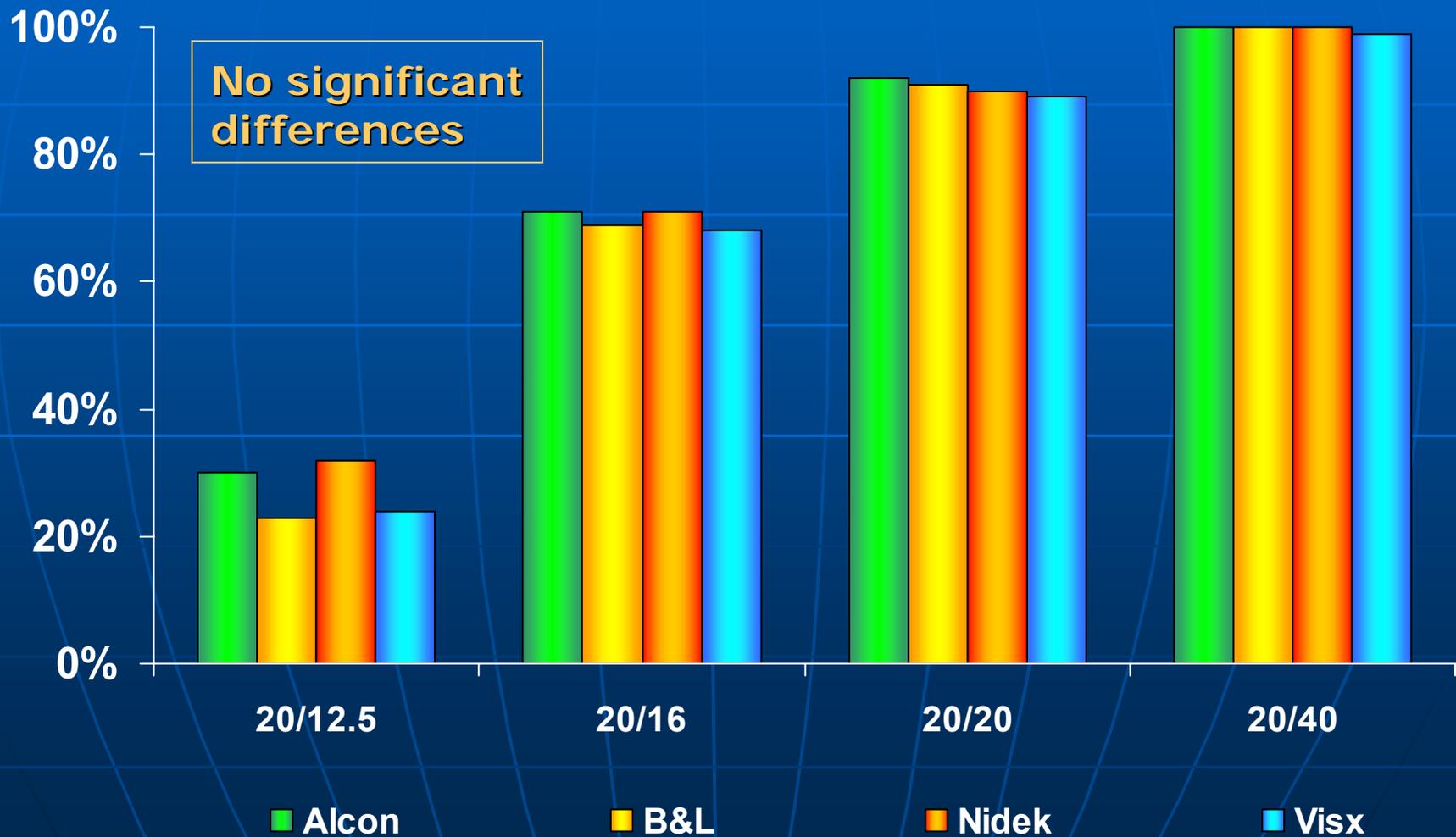
# PRK in Naval Aviator Cumulative Flight Experience

- **>48,000 flight hours** accumulated within 6 months following PRK
- **>19,500** landings since PRK
  - 2,622 carrier arrested landings
- 100% of aviators treated to date have successfully returned to full flight status

# Laser Comparative Study

## Uncorrected Visual Acuity - 1 Month

(n = 960 eyes)



# Laser Comparative Study

Change in Best-Corrected Visual Acuity - 6 Months

(n = 960 eyes)



# Keratome Comparison Study

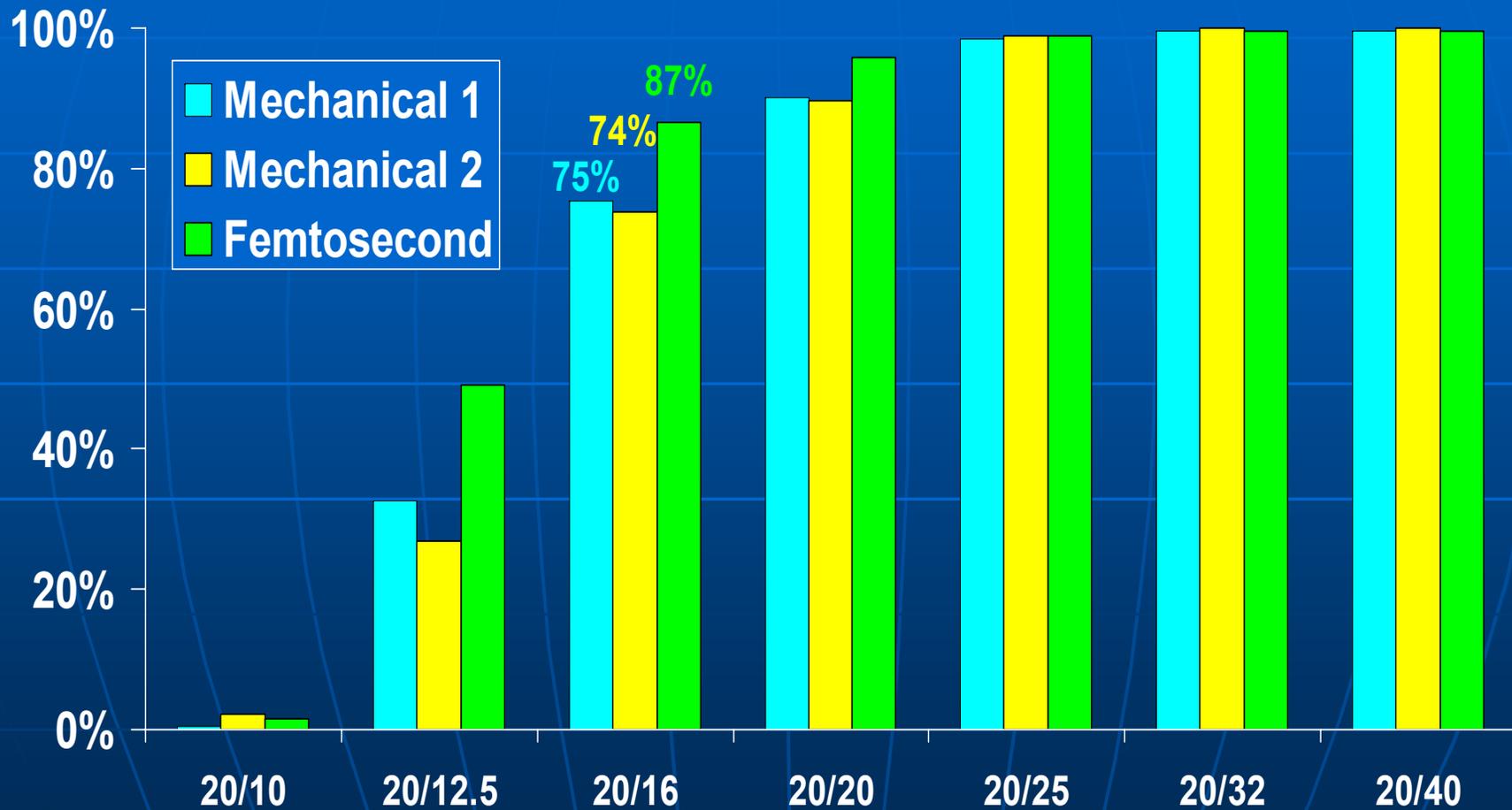
a prospective, comparative interventional clinical trial  
(n = 600 eyes)

- **2 Surgeons**
- **1 Excimer laser**
  - Wavefront-guided (Custom)
- **3 flap techniques**
  - 2 Mechanical
  - 1 Femtosecond



# Keratome Comparison

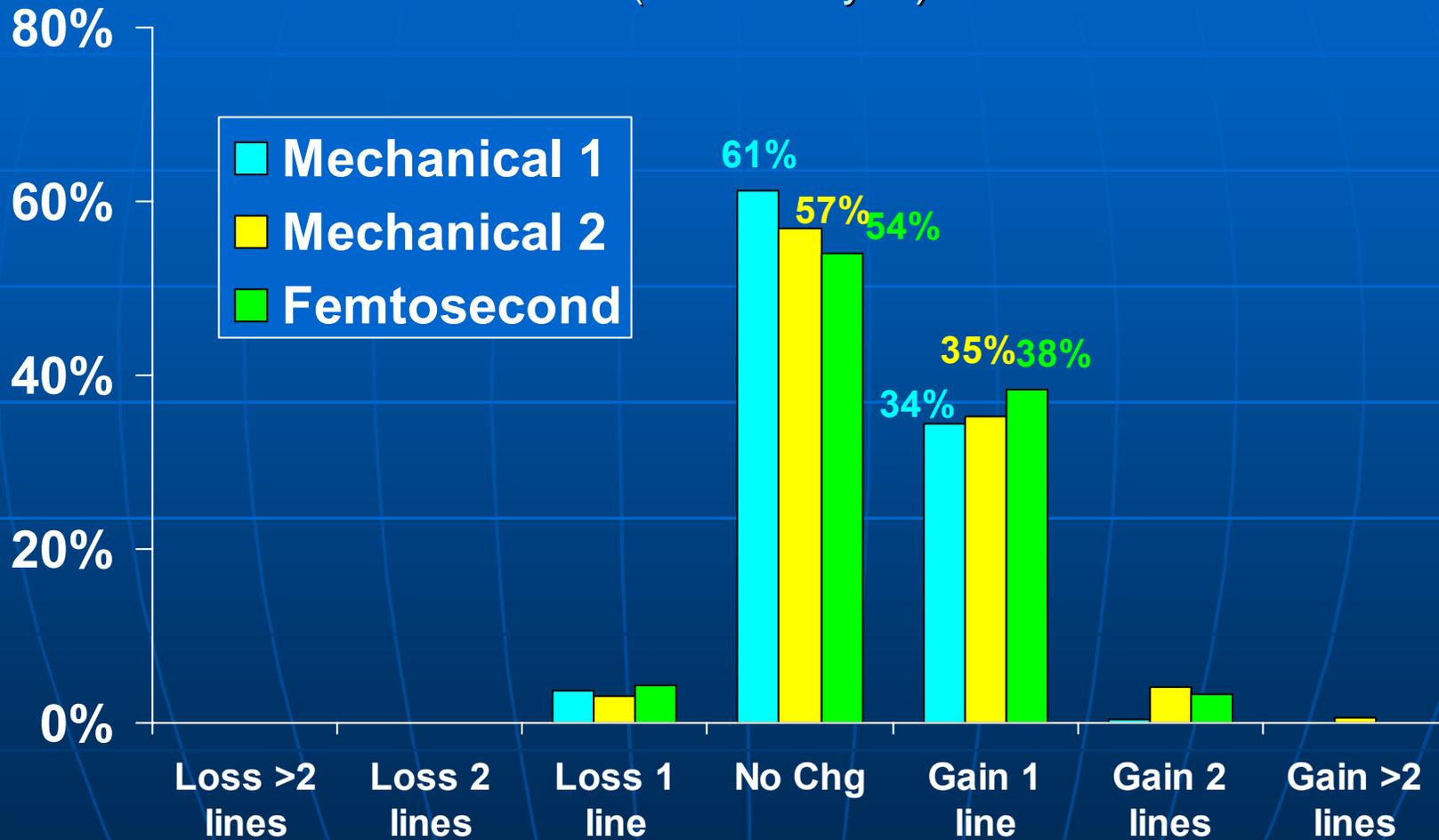
Uncorrected Visual Acuity – 1 Month  
(n = 600 eyes)



All keratomes safe and effective

# Keratome Comparison

Change in Best-Corrected Visual Acuity – 3 Months  
(n = 600 eyes)



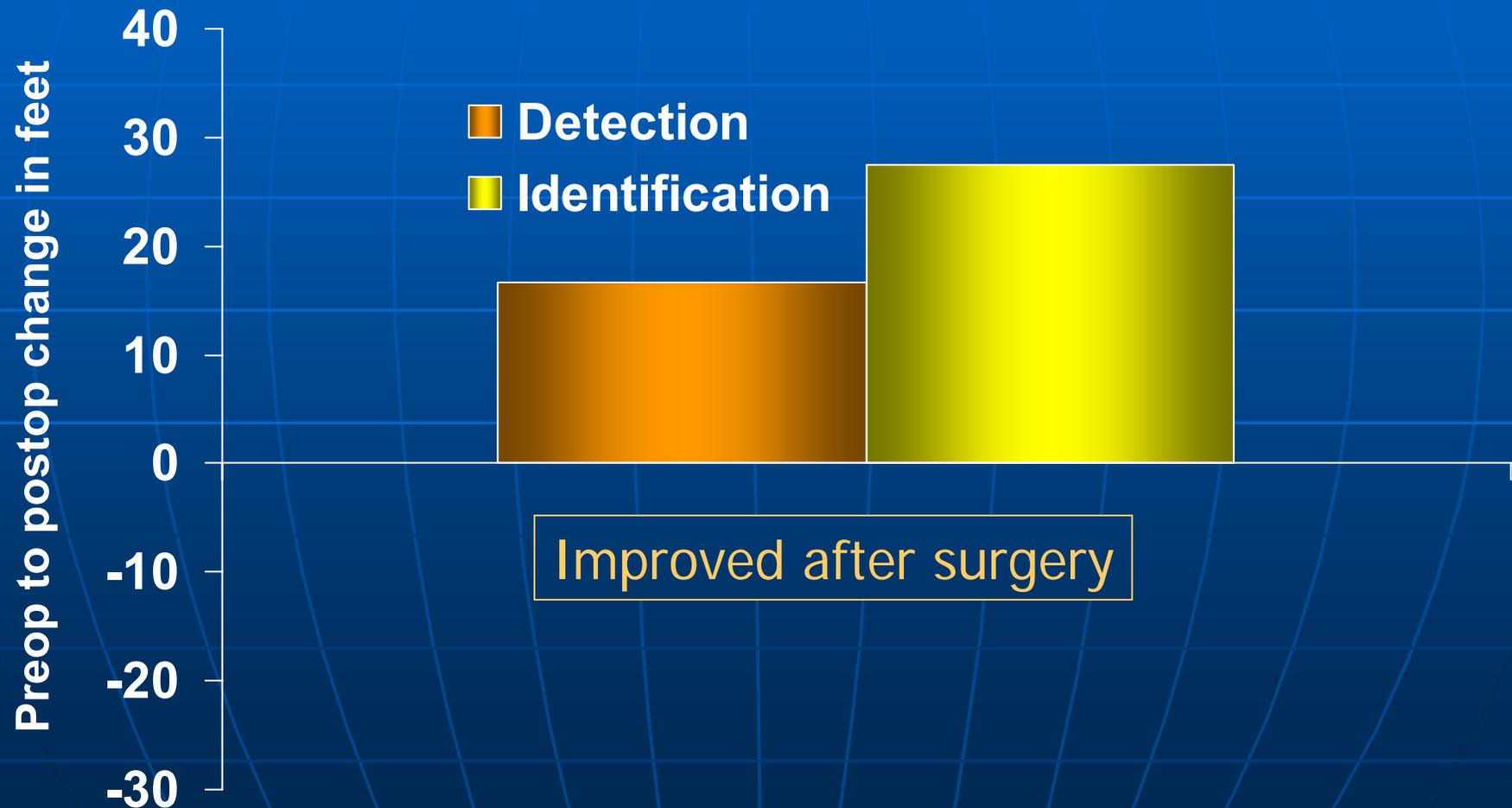
All keratomes safe and effective

# Overall Satisfaction Following LASIK

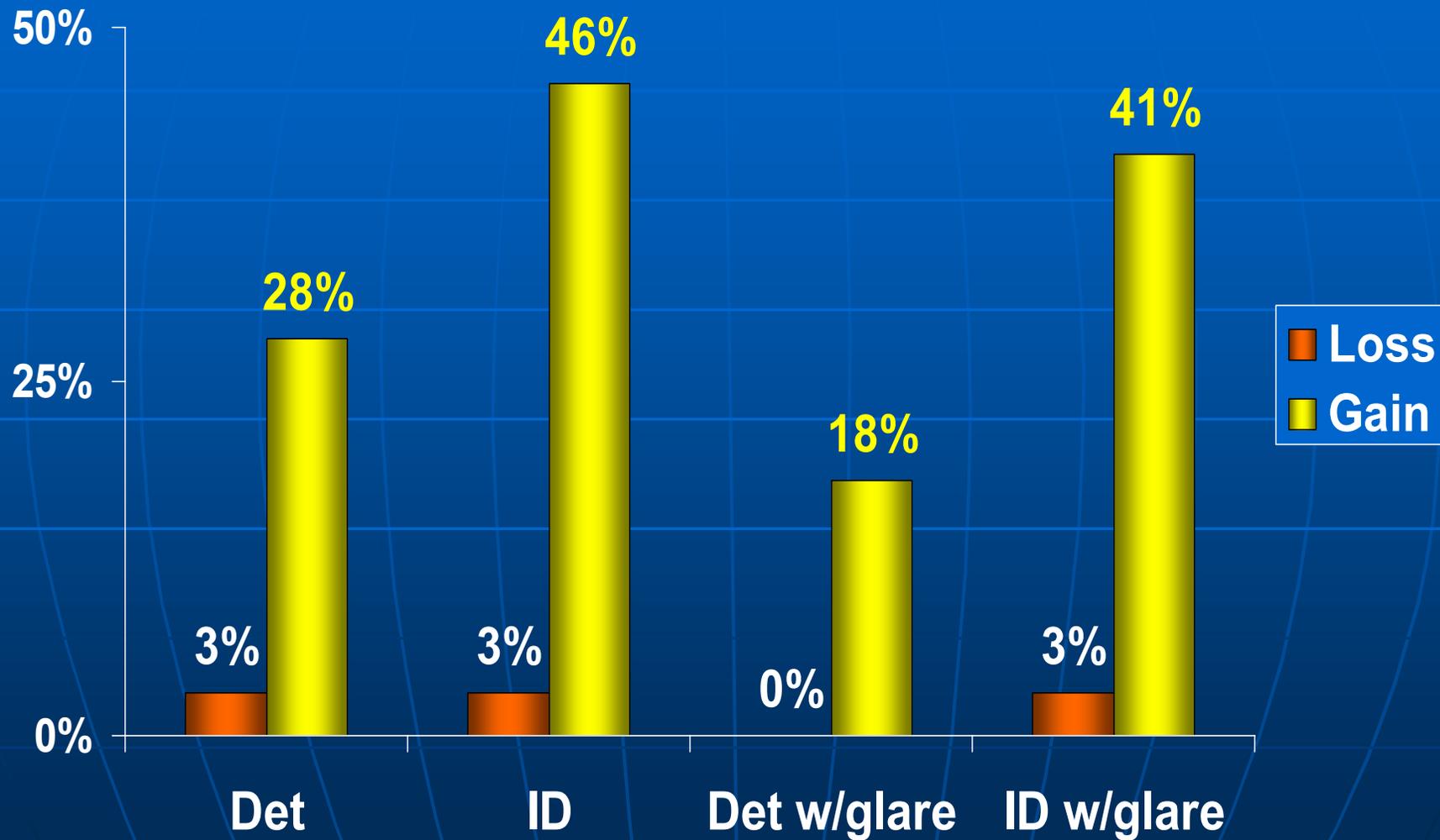
(n = 1,200 patients)



# Change in Night Driving Performance *with Glare* After LASIK

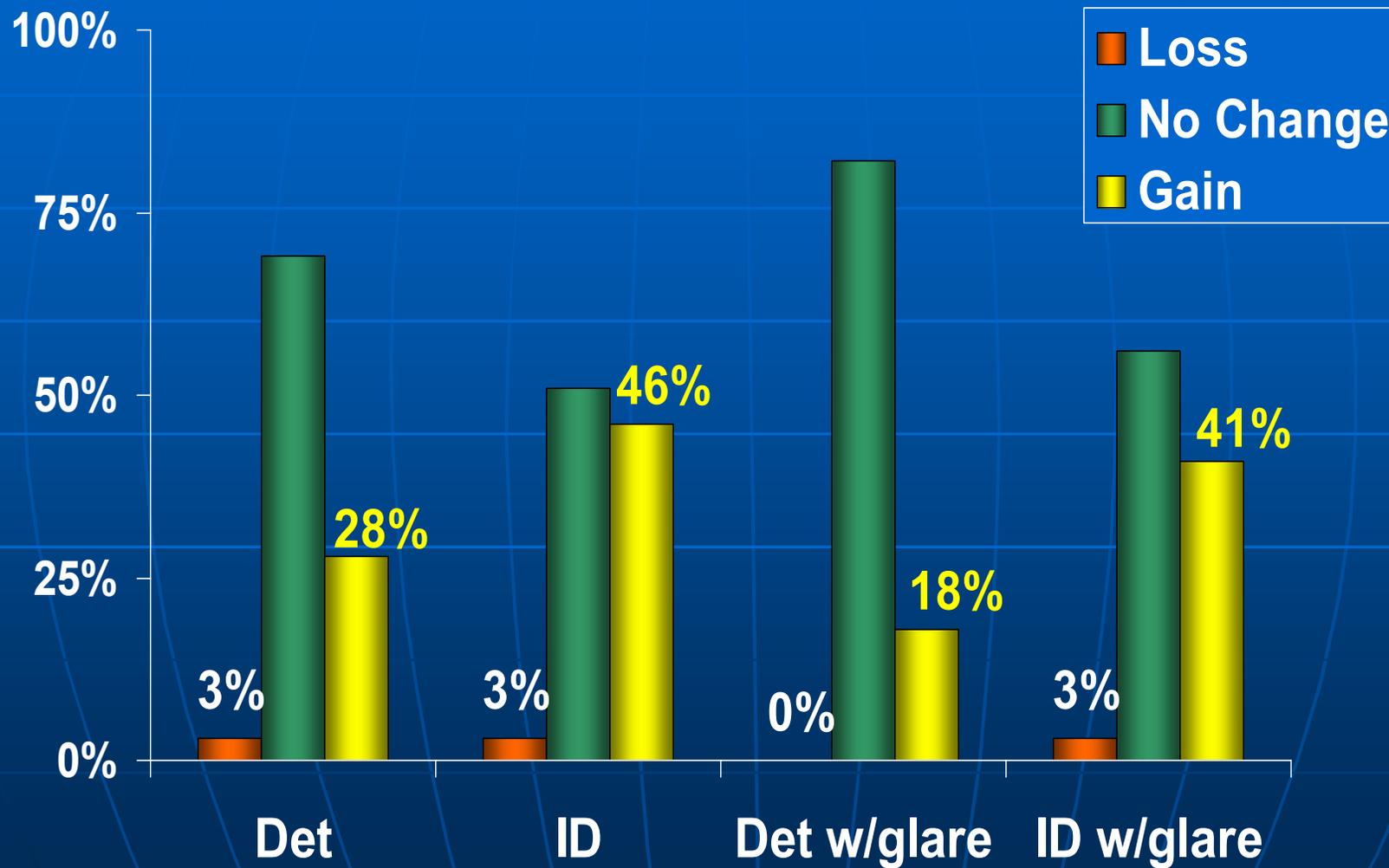


# Significant Change of Night Driving Performance



Preop-postop  $\Delta$  greater / less than - 44 feet

# Significant Change of Night Driving

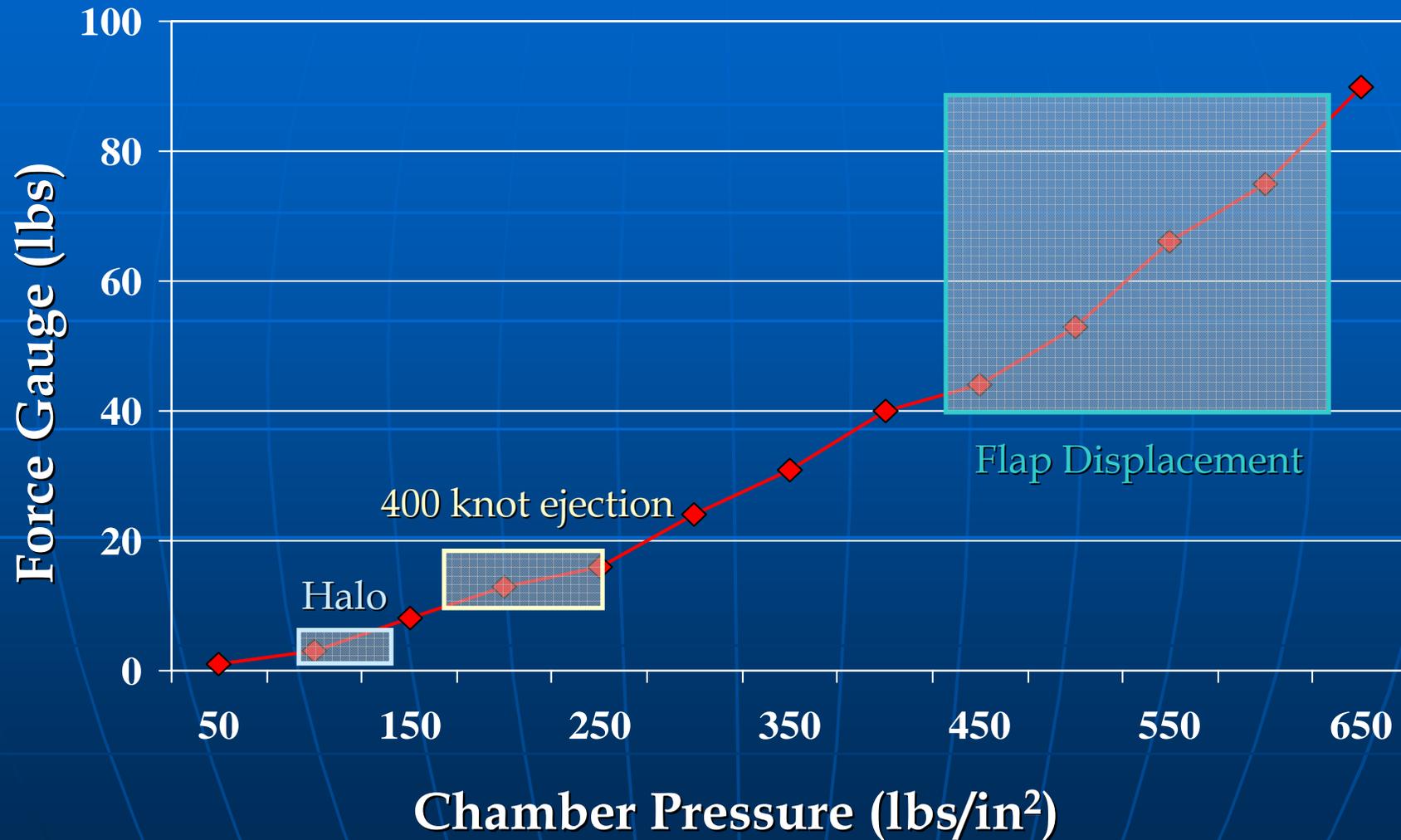


Preop-postop  $\Delta$  greater / less than - 44 feet

**Is the flap stable?**



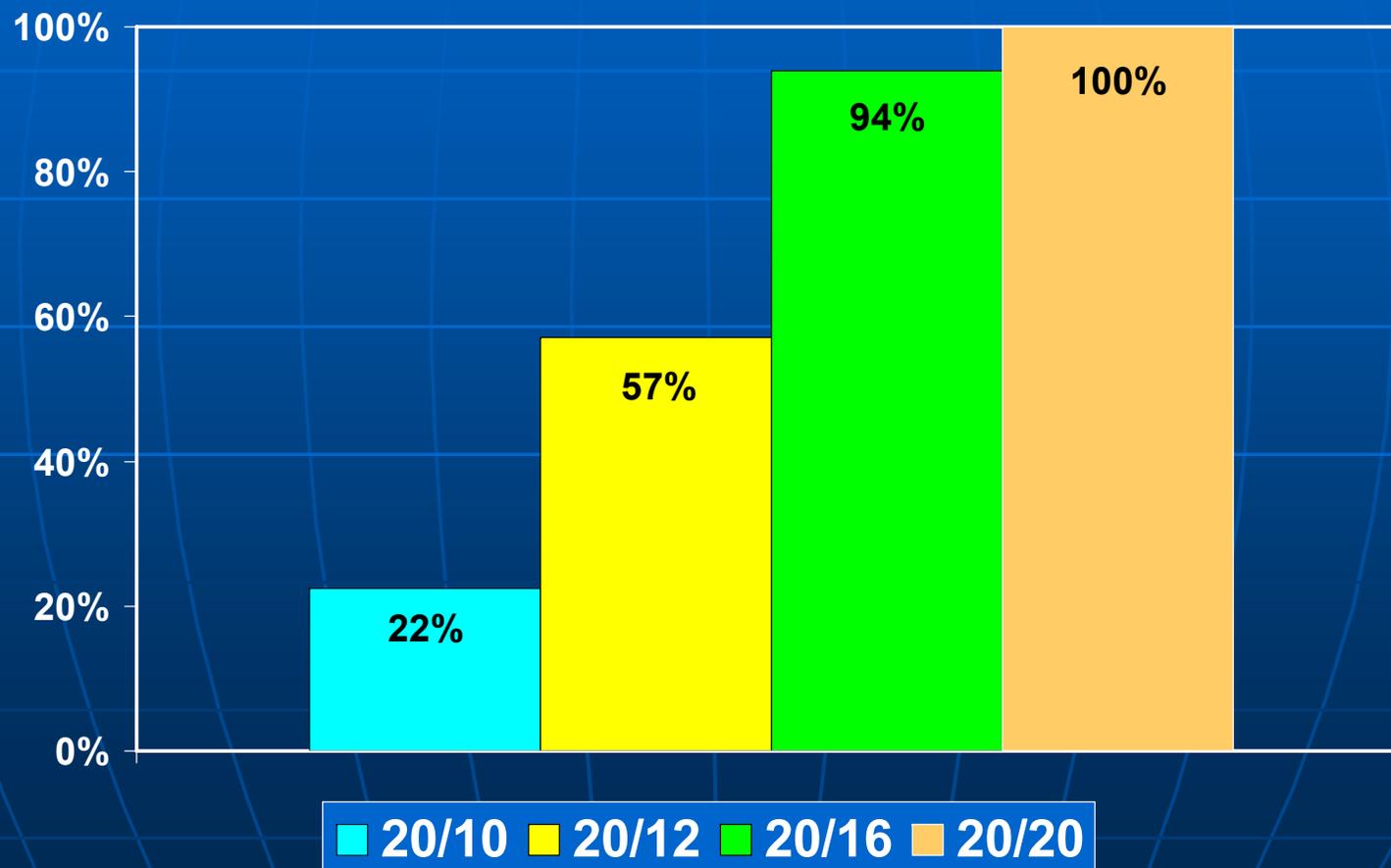
# Flap Stability Study



# LASIK in Naval Aviators

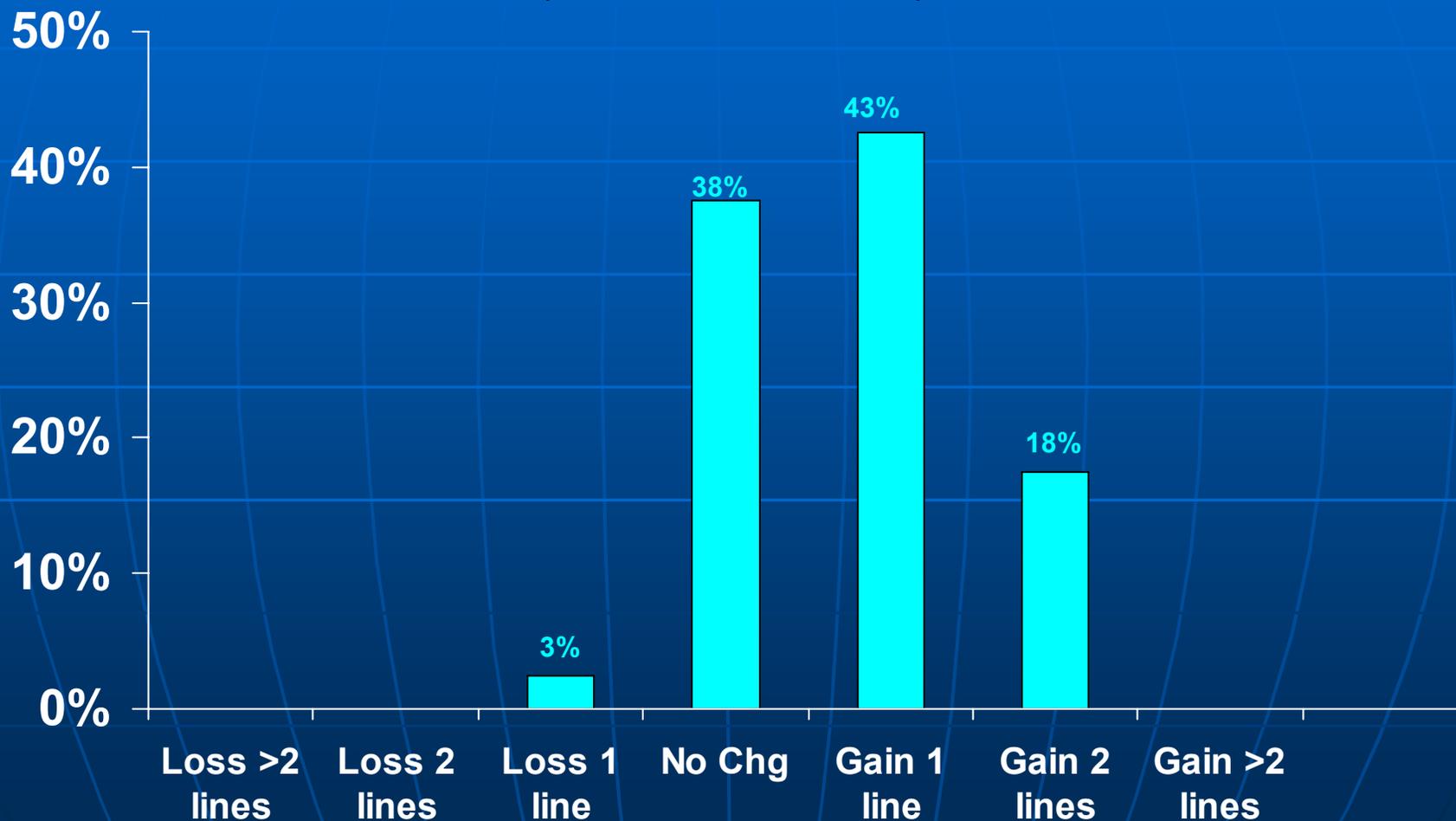
## Uncorrected Visual Acuity – 2 weeks

(n = 30 aviators)



# LASIK in Naval Aviators

Change in Best-Corrected Visual Acuity (1 month)  
(n = 30 aviators)

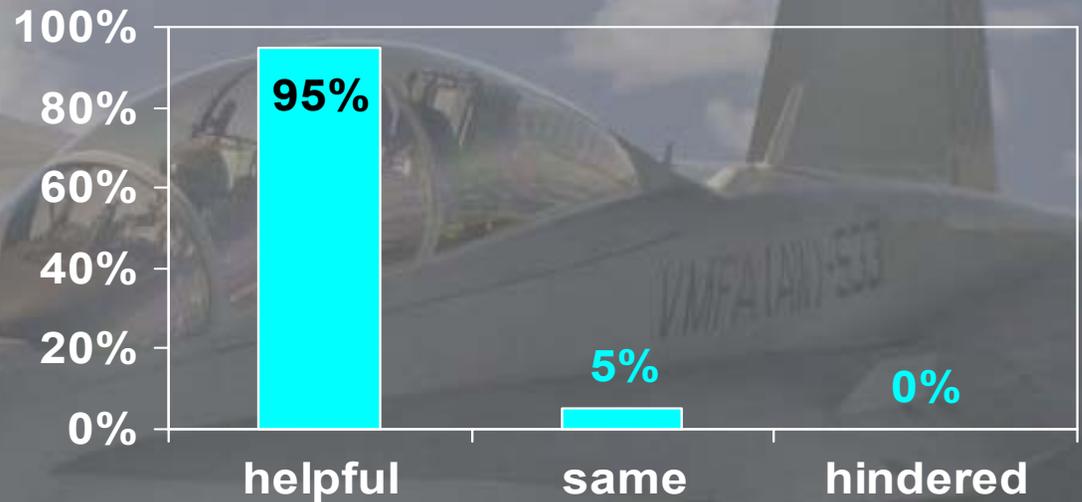


No eye is worse than 20/20 UNCORRECTED

# LASIK in Naval Aviators

## 1 month questionnaire

Do you feel LASIK has helped or hindered your effectiveness as a Naval Aviator...

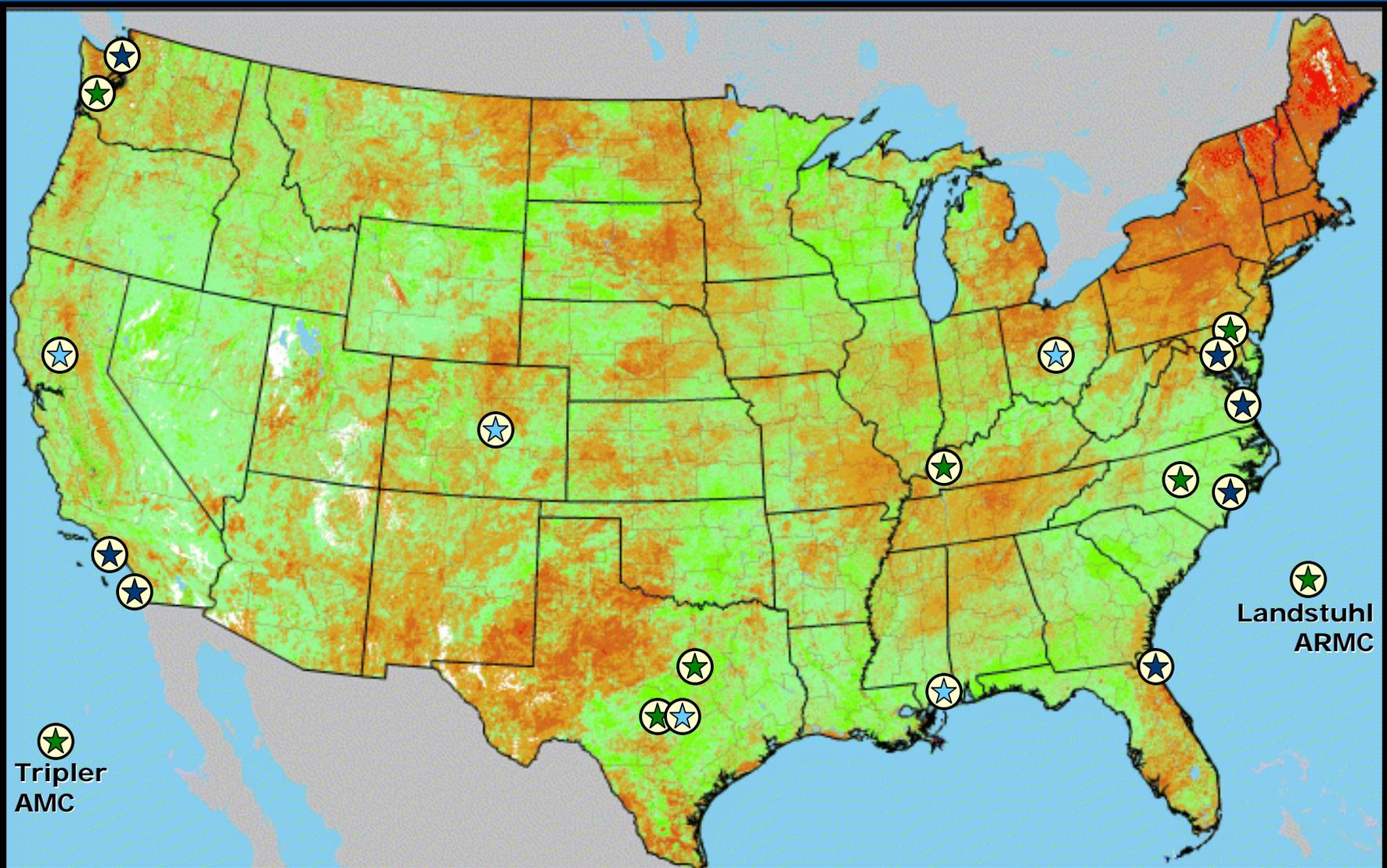


Would you recommend LASIK treatment to Naval Aviation...

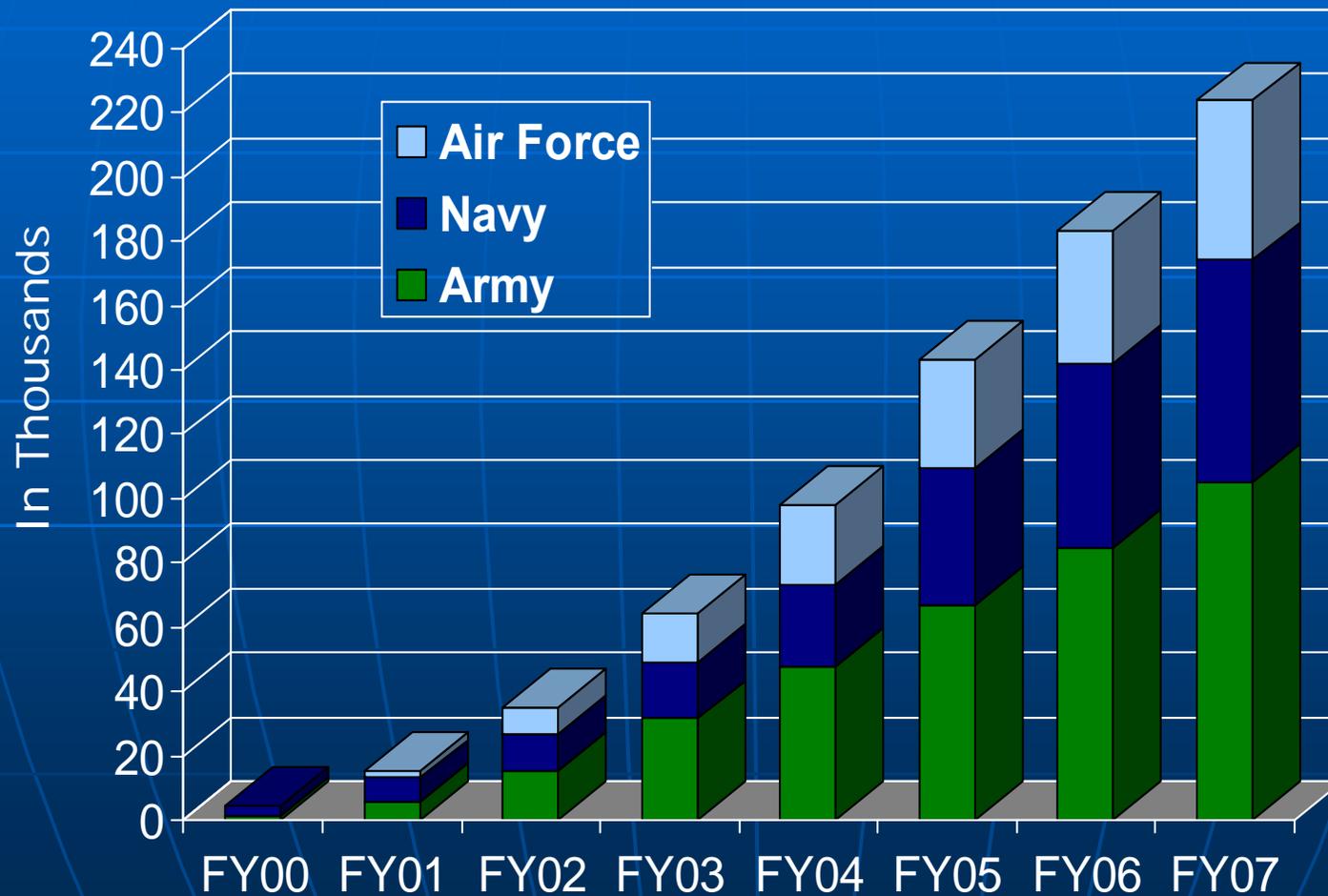


# DoD Refractive Surgery Centers Warfighter Refractive Surgery Program

20 total centers: 8 Army , 7 Navy , 5 Air Force 



# DoD Laser Vision Correction Cumulative Total



# Demographics of Laser Vision Correction Patients in the Military

- Age
  - Average age of military LVC patient: 34
    - Average age of civilian LVC patient: 37
  - Age range: 18 - 60
- Gender
  - 82% male, 18% female
    - 50:50 gender ratio in civilian LVC
- Refractive Error
  - Range: +6 to -13 diopters

# Laser Vision Correction in the Military

- Number of treatment
  - >224,000 procedures performed in the military to date
    - Air Force: >51,000 procedures
    - Army: >100,000 procedures
    - Navy: >73,000 procedures
- Impact
  - Laser Vision Correction is approved for ALL aspects of military service, including aviation, special operations and support personnel
  - LVC is approved for NASA astronauts
- Surgery is not without risk

# Relative Risk of Laser Vision Correction in the Military

- Only 1 DoD medical disability retirement related to LVC to date
  - Medical board due to quality of vision complaints despite 20/20 uncorrected vision
  - Rate of 1:112,500, or 0.0009%

# Summary of US Military Warfighter Laser Vision Correction Program

- LVC has been **overwhelmingly successful** in the military, in ALL job types
- LVC has shown **tremendous operational benefits**
  - Approved for military aviators, divers, special operations personnel and NASA astronauts
- LVC has been proven to have **extremely low risk**
  - Likelihood of disability is **0.009%**
- **Satisfaction is incredibly high** in service members receiving LVC
  - Enhances job performance
    - 95% improvement in effectiveness as Naval aviator
    - 100% of treated Naval aviators would recommend procedure to fellow aviators

# Summary Perspective

- I have had the privilege of treating and then flying with the first F/A-18 Hornet pilot to have refractive surgery and who then landed on an aircraft carrier. As we flew toward the ship that night, he relayed to me that he had never seen the carrier and the landing lights better. I took great pride in that fact, not only because I was in the jet at the time, but because I had provided a service that permanently improved his ability to perform this visually demanding task.
- Since this inaugural case, we have treated more than 1,000 aviators, several of whom I have flown with. If I did not personally believe that LVC was in their best interest, I would not be treating anyone on active duty with LVC or advocating that it be done in the civilian community.