



Current Health Trends in Helicopter Pilots

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Historical Perspective

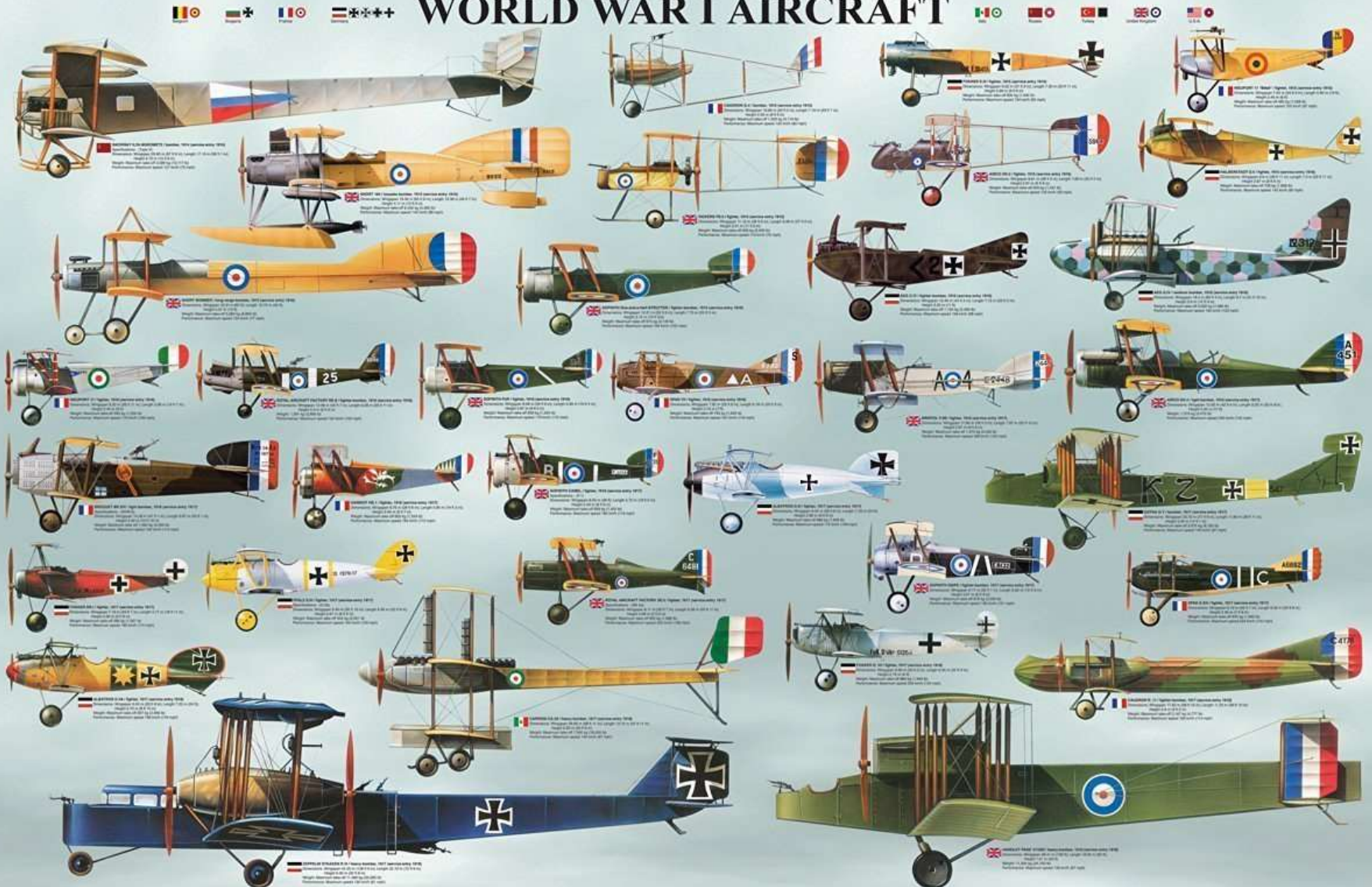


- “Flight Surgeons” created to address aviator problems in WWI
- At the time, only fixed-wing aircraft



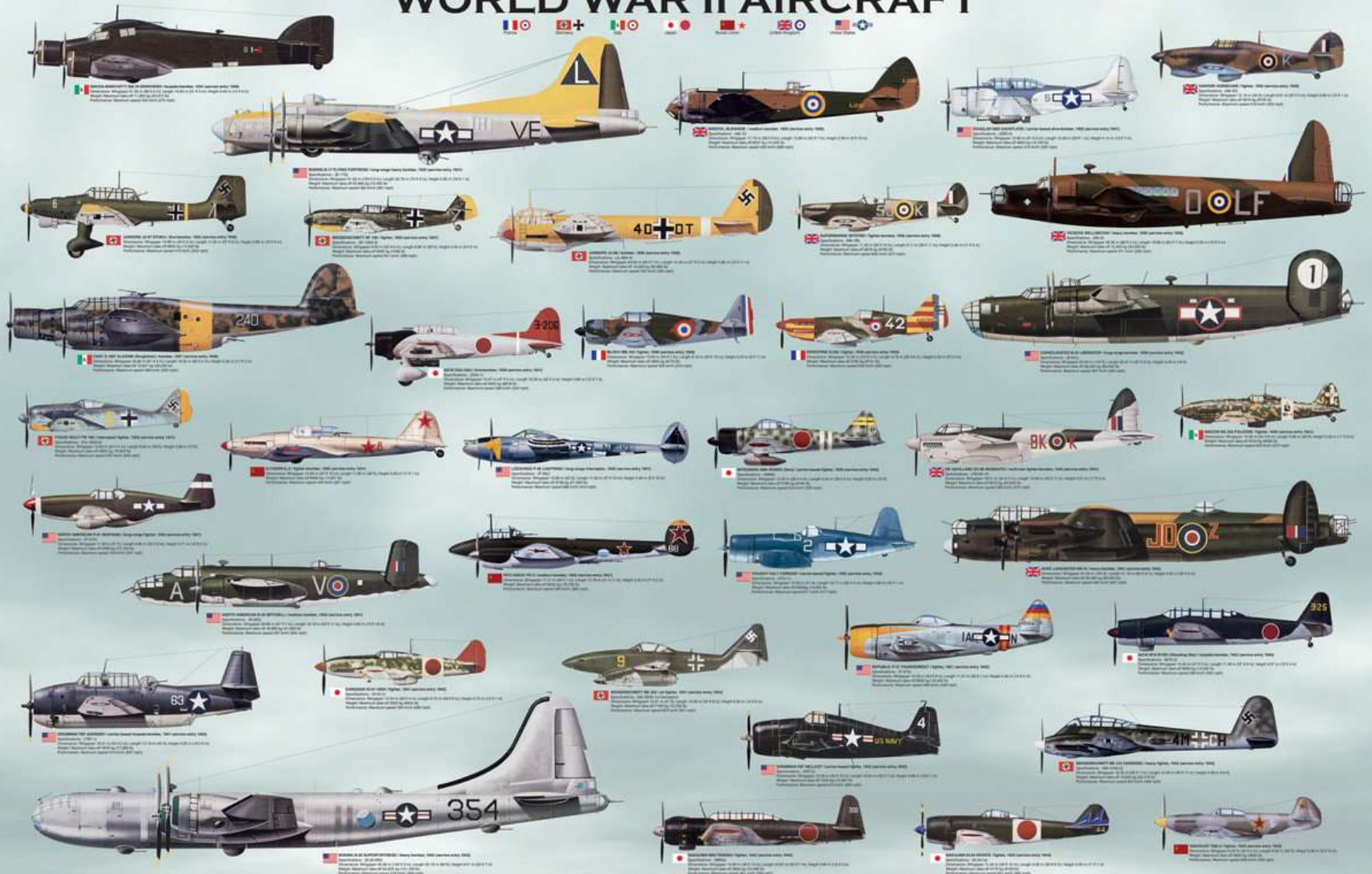


WORLD WAR I AIRCRAFT





France Germany Italy Japan Russia United Kingdom United States





Modern Helicopter Uses





Modern Helicopter Aircrew





Study Strategy



- Phase I Literature Review
- Phase II Epidemiology Study
- Phase III Summary, Conclusions, Recommendations



Literature Review



» Background

» This is a helicopter



» This is a tiltrotor





Literature Review



- » Background (con't)
 - » Helicopters – lots of literature over the years
 - » Tiltrotor –
 - » Nothing in open technical or peer-reviewed literature





Rotary Wing Aviator Health References



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Literature Review Highlights



- » Helicopter pilots seem to have a lot of neck pain.
- » Helicopter pilots seem to have a lot of back pain.
- » Helicopters are very noisy.



Recent Army Data (Curry & Kelley, in review)



Top 5 ICD-9 Diagnoses in Army Aircrew 2005-2015

Rank	Disorder	Percent of all Diagnoses
1	Lumbago	4.7
2	Hypertension	4.4
3	Hearing loss	4.0
4	Hyperlipidemia	3.9
5	Metabolic syndrome	3.4

Top 5 Diagnoses (by Category) in Army Aircrew 2005-2015

Rank	Disorder	Percent of all Diagnoses
1	Spinal	15.2
2	Orthopedic	12.9
3	Disorders of blood fats	10.5
4	GI tract	10.3
5	ENT	10.3

(Data to help target epi study)



Epidemiological Study



- » Retrospective cohort study
- » Defense Medical Surveillance System (DMSS)
- » 1998-2015, <40y/o when joined cohort, active component
- » Exposed cohort: military helicopter pilots and tiltrotor pilots
 - » >1,000 flight hours
- » Unexposed cohort
 - » #1 – non-pilot officers
 - » #2 – fixed-wing pilots
- » Evaluated 31 medical conditions from previous epi studies, literature
- » Incidence Rate Ratios (IRR) w Poisson regression to generate adjusted IRR estimates; adjusted by sex, age category, rank



Epidemiological Study (con't)



Results

- » Exposed – 3,733 pilots (3,601 helicopter, 132 tiltrotor)
- » Unexposed #1 – 45,566 service members
- » Unexposed #2 – 31,341 service members



Epidemiological Study by AFHSB (con't)



» Health of Exposed Cohort vs Non-Pilot Officers

- » Helicopter/Tiltrotor Pilots had significantly lower risk of 26/31 health outcomes than Non-Pilot Officers
- » “ “ “ had no difference in risk of 4/31 health outcomes
- » “ “ “ had significantly higher risk of metabolic syndrome than Non-Pilot Officers

Higher Risk for Non-Pilot Cohort		No Difference Between Groups	Higher Risk for Exposed Cohort
Lumbago	Allergic Rhinitis	Dupuytren's Syndrome	Metabolic Syndrome
COPD	Displacement lumbar disc	Chronic airway obstructions	
Hyperglyceridemia	Sleep Apnea	Chronic bronchitis	
Esophageal Reflux	Degeneration lumbar disc	Emphysema	
Asthma	Hypothyroidism		
Hyperlipidemia	Testicular dysfunction		
Raynaud's Syndrome	Cervical disc displacement		
Allergic Rhinitis	PTSD		
Carpal Tunnel Syndrome	Displacement lumbar disc s myelopathy		
Tarsal Tunnel Syndrome	Anxiety state unspecified		
Hypertension	Migraine		
Hearing Loss	Degeneration of lumbar or lumbosacral intervertebral disc		
Obstructive sleep apnea	Maj depressive affective disorder		



Epidemiological Study by AFHSB (con't)



» Health of Exposed Cohort vs Fixed-Wing Pilots

- » Helicopter/Tiltrotor Pilots had significantly lower risk of allergic rhinitis than Fixed-Wing Pilots
- » “ “ “ had no difference in risk of 26/31 health outcomes between groups
- » “ “ “ had significantly higher risk of 3/31 health outcomes than Fixed-Wing Pilots

Higher Risk for Fixed-Wing Pilots	No Difference Between Groups		Higher Risk for Exposed Cohort
Allergic Rhinitis	PTSD	Dupuytren's Syndrome	Metabolic Syndrome
	Cervical disc displacement	COPD	Lumbago
	Testicular dysfunction	Sleep Apnea	Hyperlipidemia
	Hypothyroidism	Emphysema	
	Degeneration lumbar disc	Hypertension	
	Displacement lumbar disc	Hearing Loss	
	Esophageal Reflux	Asthma	
	Maj depressive affective disorder	Raynaud's Syndrome	
	Displacement lumbar disc s myelopathy	Carpal Tunnel Syndrome	
	Anxiety state unspecified	Tarsal Tunnel Syndrome	
	Migraine	Chronic airway obstructions	
	Degeneration of lumbar or lumbosacral intervertebral disc	Chronic bronchitis	
	Hyperglyceridemia		



Epidemiological Study by AFHSB (con't)



- » Service-specific analysis (only USAF had difference)
 - » USAF Helicopter/Tiltrotor Pilots had significantly higher risk of neck sprains/strains than USAF Fixed-Wing Pilots

Higher Risk for Fixed-Wing Pilots	No Difference Between Groups		Higher Risk for Exposed Cohort
			Neck Sprains/Strains

USAF-only Analysis



Conclusions



- » Career military helicopter pilots and tiltrotor pilots are healthier than the military non-pilot officer control population, based on the 31 health conditions assessed
- » Compelling evidence overall that career military helicopter pilots are at increased occupational risk of
 - a. Low-back pain
 - b. Neck strain/sprain
- » Exposed cohort had elevated risk of metabolic syndrome and hyperlipidemia
 - » Believed to be detection bias due to Army crusade to diagnose cardiac risk factors during the study period



Recommendations



- » Increase resources and research to develop prevention and mitigation strategies to reduce the incidence of low back pain and neck strain/strain in career helicopter pilots.
- » Investigate the higher incidence of hearing loss among the non-pilot officer cohort.
- » Determine if helicopter pilots are at high risk of metabolic syndrome and hyperlipidemia or if this finding is the result of a reporting bias or information bias.



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