Interstitial Lung Disease: Gender and Region Variations in Mortality Over Two Decades

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INTRODUCTION:

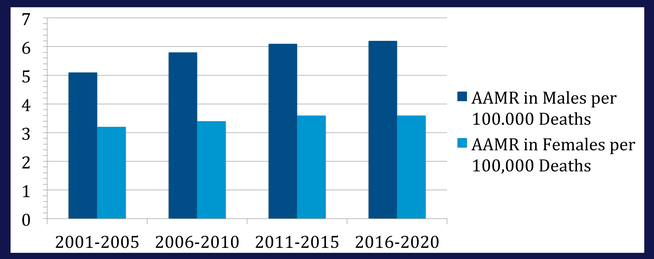
- Interstitial Lung Disease (ILD) is characterized by inflammation of the alveoli, distal airways, and parenchyma/interstitial tissue that can cause progressive fibrosis over time.
- Differences in gender and environment can affect disease progression and outcomes.
- We hypothesized that there might be gender and regional differences in mortality rates of ILD over the last two decades.

METHODS AND MATERIALS:

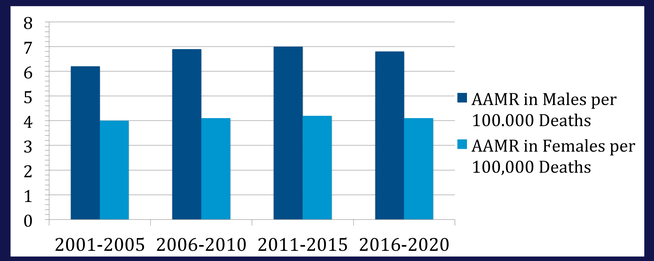
- Retrospective observational study.
- Death certificate data for ILD (ICD-10 Codes: J84.0, J84.1, J84.8, and J84.9) was retrieved from Center for Disease Control and Prevention's Wide-Ranging Online Data for Epidemiological Research (WONDER) database.
- The data was examined from 2001-2020 and further stratified into 5-year periods.
- Crude Mortality Rate (CMR) and Age-Adjusted Mortality Rate (AAMR) per 100,000 deaths (with 95% confidence interval) were calculated between male and female gender in the four U.S census regions (CR-1 Northeast (NE); CR-2 Midwest (MW); CR-3 South; CR-4 West) to explore gender and region variations.

RESULTS:

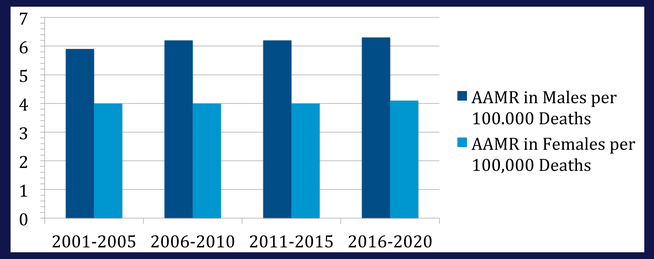
- The overall CMR per 100,000 deaths revealed an upward trend in both genders in all 4 U.S. census regions, the highest being in MW.
- The overall AAMR per 100,000 deaths also revealed an upward trend in both genders from 4.3 to 5.0 per 100,000 deaths (an increase of 16.3%) over the last 20 years.
- For Males: The overall AAMR per 100,000 deaths increased to 10.16% from 2001-2020
- For Females: The overall AAMR per 100,000 deaths minimally changed (+2%) across all 4 census regions.



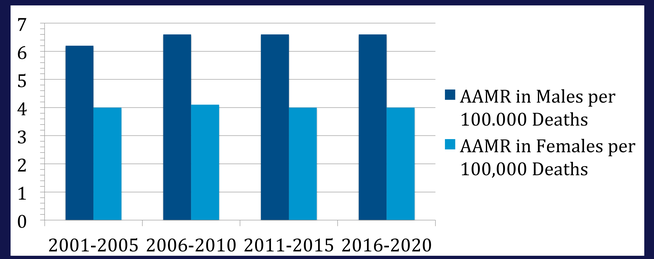
- **NE**: AAMR for males increased from 5.1 to 6.2 per 100,000 deaths from 2001-2020. Overall (+21.5%)



- **MW**: AAMR for males increased from 6.2 to 7 per 100,000 deaths (+12.9%) from 2001-2015 but decreased to 6.8 per 100,000 deaths (-2.86%) from 2016 to 2020.



- **South**: AAMR for males from 2001 to 2020 increased from 5.9 to 6.3 per 100,000 deaths (+6.77%).



- **West**: AAMR for males increased from 6.2 to 6.6 per 100,000 deaths (+6.45%) from 2001 to 2010 with no increase seen after.

Census Region	Year	Gender	Deaths	Population	CMR per 100,000 (95% CI)	AAMR per 100,000 (95% CI)	Total Deaths
Census Region 1: North-East	2001-2005	Male (M)	6018	131369325	4.6 (4.5-4.7)	5.1 (5-5.3)	9.00%
		Female (F)	5897	139899328	4.2 (4.1-4.3)	3.2(3.1-3.3)	8.80%
	2006-2010	Male (M)	7268	133262346	5.5 (5.3-5.6)	5.8 (5.6-5.9)	9.30%
		Female (F)	6557	141239942	4.6 (4.5-4.8)	3.4 (3.3-3.5)	8.40%
	2011-2015	Male (M)	8331	136150489	6.1 (6-6.3)	6.1 (5.9-6.2)	9.50%
		Female (F)	7289	143511497	5.1 (5-5.2)	3.6 (3.5-3.7)	8.30%
	2016-2020	Male (M)	9415	136840491	6.9(6.7-7)	6.2(6-6.3)	9.50%
		Female (F)	7853	143783351	5.5(5.3-5.6)	3.6(3.5-3.7)	7.90%
Census Region 2: Midwest	2001-2005	Male (M)	8376	160232023	5.2 (5.1-5.3)	6.2 (6.1-6.4)	12.50%
		Female (F)	8132	166123932	4.9(4.8-5)	4 (3.9-4)	12.10%
	2006-2010	Male (M)	10014	163548100	6.1 (6-6.2)	6.9 (6.7-.7)	12.90%
		Female (F)	8987	168973517	5.3(5.2-5.4)	4.1 (4-4.2)	11.60%
	2011-2015	Male (M)	11245	166393797	6.8 (6.6-6.9)	7 (6.8-7.1)	12.80%
		Female (F)	9708	171281736	5.7(5.6-5.8)	4.2(4.1-4.3)	11.00%
	2016-2020	Male (M)	12336	168398174	7.3 (7.2-7.5)	6.8 (6.7-7)	12.40%
		Female (F)	9994	172677098	5.8 (5.7-5.9)	4 (3.9-4.1)	10.00%
Census Region 3: South	2001-2005	Male (M)	12324	256006292	4.8 (4.7-4.9)	5.9 (5.8-6)	18.40%
		Female (F)	11928	266738006	4.5 (4.4-4.6)	4 (3.9-4)	17.80%
	2006-2010	Male (M)	14534	274441543	5.3(5.2-5.4)	6.2 (6.1-6.3)	18.70%
		Female (F)	13294	285613421	4.7 (4.6-4.7)	4 (3.9-4.1)	17.10%
	2011-2015	Male (M)	16991	290604100	5.8 (5.8-5.9)	6.2 (6.1-6.3)	19.30%
		Female (F)	14872	302038091	4.9 (4.8-5)	4 (3.9-4.1)	16.90%
	2016-2020	Male (M)	20206	305262591	6.6(6.5-6.7)	6.3(6.3-6.4)	20.30%
		Female (F)	17128	317712757	5.4(5.3-5.5)	4.1(4-4.1)	17.20%
Census Region 4: West	2001-2005	Male (M)	7615	164968398	4.6 (4.5-4.7)	6.2 (6.1-6.3)	10.20%
		Female (F)	6845	165686674	4.1 (4-4.2)	4 (3.9-4.1)	11.30%
	2006-2010	Male (M)	9248	175538861	5.3(5.2-5.4)	6.6 (6.5-6.8)	11.90%
		Female (F)	7872	176604422	4.5 (4.4-4.6)	4.1 (4-4.2)	10.10%
	2011-2015	Male (M)	10861	185451886	5.9 (5.7-6)	6.6 (6.5-6.7)	12.30%
		Female (F)	8752	186479076	4.7 (4.6-4.8)	4 (4-4.1)	9.90%
	2016-2020	Male (M)	12657	194027991	6.5(6.4-6.6)	6.6(6.5-6.7)	12.70%
		Female (F)	9991	195035318	5.1(5-5.2)	4 (4-4.1)	10.00%

DISCUSSION:

- CMR and AAMR showed an upward trend for the male gender in all U.S census regions from 2001-2020. Protective effect of Estrogen in females, higher prevalence of smoking in males, and genetics can be some of the reasons.
- Aging population, environmental exposures, lack of effective treatments and possibly increased awareness and diagnosis can lead to higher mortality rates.
- Notably, from year 2011 to 2020, minimal change in AAMR was seen. This can be attributed to advances in treatment, improved diagnosis and screening, clinical trials, patient education and support and better understanding of disease.
- Misclassification of data is a weakness of online database which is our study's limitation.

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