Severe asthma in numbers

Dany Gaspard, MD

Assistant Professor of Medicine, Lebanese American University

Conflict of interest

I have no conflict of interest in regards to this presentation

Why the interest in Severe asthma?

- Represents 10% of the overall asthma population
- Responsible for the majority of asthma-related morbidity and mortality
- Severely affects productivity, causes high degree of absenteeism
- High cost to the medical system

Outline

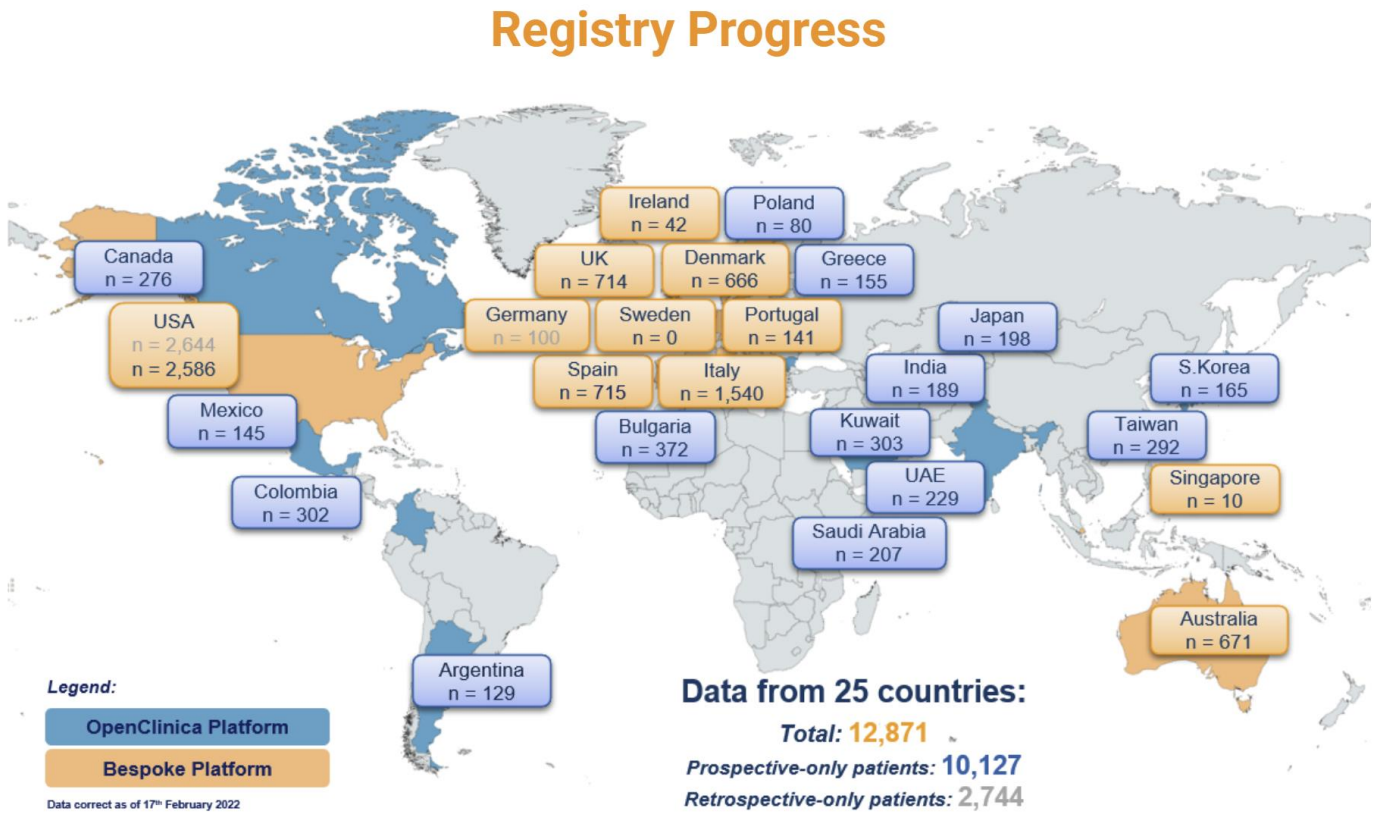
ISAR and some severe asthma numbers

The power of registries

LPS severe asthma registry

The international severe asthma registry

- The first severe asthma registry done internationally
- Now up to 30 countries



Last updated: 17th February 2022

Country	Lead	Country	Lead
Argentina	Jorge Máspero	Japan	Takashi Iwanaga
Australia	Matthew Peters	Kuwait	Mona Al-Ahmad
Bulgaria	George C. Christoff	Mexico	Désirée Larenas-Linnemann
Canada	J. Mark FitzGerald	Norway	Sverre Lehmann
Colombia	Carlos Torres	Poland	Piotr Kuna
Denmark	Celeste M. Porsbjerg	Portugal	João A Fonseca
Estonia	Alan Altraja	Saudi Arabia	Ryad Al-Lehebi
Finland	Lauri Lehtimäki	Singapore	Mariko Koh Siyue
France	Arnaud Bourdin Camille Taille	South Korea	Chin Kook Rhee Kwang Ha Yoo
Germany	Christian Taube	Spain	Luis Perez-de-Llano
Greece	Andrianna I. Papaioannou	Sweden	David Aronsson
Iceland	Unnur Björnsdóttir	Taiwan	(Steve) Diahn-Warng Perng
India	Sundeep Salvi	United Arab Emirates	Bassam Mahboub
Ireland	Richard W. Costello	United Kingdom	Andrew Menzies-Gow Liam G. Heaney
Italy	George Walter Canonica Enrico Heffler	United States of America	Eileen Wang

The international severe asthma registry

Inclusion Criteria

• According to 2018 definitions of Global Initiative for Asthma (GINA) Step 5 treatment; or

• GINA Step 4 treatment and uncontrolled asthma (as outlined by American Thoracic Society/European Respiratory Society guidelines below:)

1. **Poor symptom control**: ACQ >1.5, ACT <20 (or “not well controlled” by National Asthma Education and Prevention Program/GINA guidelines)

2. **Frequent severe exacerbations**: two or more bursts of systemic CS (>3 days each) in the previous year

3. **Serious exacerbations**: at least one hospitalisation, ICU stay or mechanical ventilation in the previous year

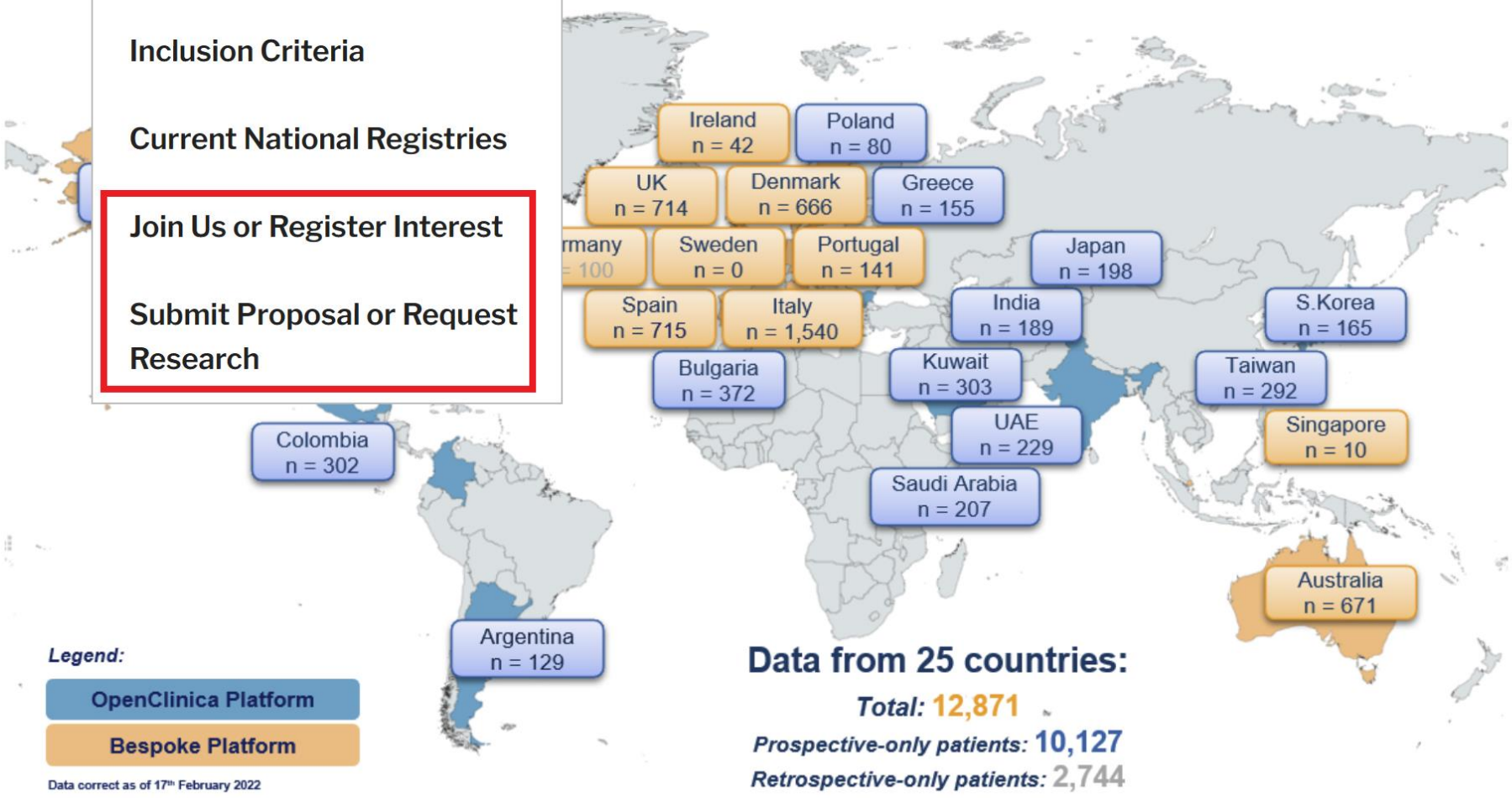
4. **Airflow limitation**: after appropriate bronchodilator withhold FEV1 <80% predicted (in the face of reduced FEV1/FVC defined as less than the lower limit of normal)

ISAR

Registry | Collaborations | Research | Dissemination | News & Events | FAQ

- ISAR Country Leads
- The Registry
- Inclusion Criteria
- Current National Registries
- Join Us or Register Interest
- Submit Proposal or Request Research

egistry Progress



Published and in press ISAR articles (13):

Project Title	First Author	Title	Journal	Year	Volume (Issue)	Page no.	DOI	Link
GLITTER Phase I	Wenjia Chen	Characterization of patients in the International Severe Asthma Registry with high steroid exposure who did or did not initiate biologic therapy	*J Asthma Allergy*	2022	2022 (15)	1491-1510	10.2147/JAA.S377174	PDF PubMed
Lung Function Trajectory	Seyi Soremekun	Asthma Exacerbations are Associated with a decline in Lung Function: A Longitudinal Population-Based Study	*Thorax*	2022	Online Ahead Of Print			
BACS	Celeste M. Porsbjerg	Global Variability in Administrative Approval Prescription Criteria for Biologic Therapy in Severe Asthma	*J Allergy Clin Immunol Pract*	2022	10 (5)	1202 - 1216	10.1016/j.jaip.2021.12.027	PDF PubMed
SUNNIE	Andrew N. Menzies-Gow	Real-world biologic use and switch patterns in severe asthma: data from the International Severe Asthma Registry and the US CHRONICLE Study	*J Asthma Allergy*	2022	2022 (15)	62 - 68	10.2147/JAA.S328653	PDF PubMed
RADIANT	John Busby	Impact of socioeconomic status on adult patients with asthma: a	*J Asthma Allergy*	2021	14	1375 - 1388	10.2147/JAA.S326213	PDF PubMed

Project Title	First Author	Title	Journal	Year	Volume (Issue)	Page no.	DOI	Link
		population-based cohort study from UK primary care						
Characterization of eosinophilic asthma phenotypes	Marjan Kerkhof	Asthma phenotyping in primary care: applying the International Severe Asthma Registry eosinophil phenotype algorithm across all asthma severities	*J Allergy Clin Immunol Pract*	2021	14; S2213-2198 (7)	2680-2688.e7	10.1016/j.jaip.2021.07.056	PDF PubMed
ISAR Core 2018	Liam Heaney	Eosinophilic and non-eosinophilic asthma: an expert consensus framework to characterize phenotypes in a global real-life severe asthma cohort	*CHEST*	2021	160(3)	814 - 830	10.1016/j.chest.2021.04.013	PDF PubMed
BRISAR	Eve Denton	Cluster analysis of inflammatory biomarker expression in the International Severe Asthma Registry (ISAR)	*J Allergy Clin Immunol Pract*	2021	9(7)	2680-2688.e7	10.1016/j.jaip.2021.02.059	PDF PubMed
ISAR Hidden Severe Asthma	Dermot Ryan	Potential severe asthma hidden in UK primary care	*J Allergy Clin Immunol Pract*	2021	9(4)	1612-1623.e9	10.1016/j.jaip.2020.11.053	PDF PubMed
ISAR Protocol	J. Mark FitzGerald	International severe asthma registry (ISAR): protocol for a global registry	*BMC Med Res Methodol*	2020	20(1)	212	10.1186/s12874-020-01065-0	PDF PubMed

Project Title	First Author	Title	Journal	Year	Volume (Issue)	Page no.	DOI	Link
ISAR Mission Statement	The ISAR Study Group	International Severe Asthma Registry: Mission Statement	*CHEST*	2020	157(4)	805-814	10.1016/j.chest.2019.10.051	PDF PubMed
ISAR Global Core 2017	Eileen Wang	Characterization of severe asthma worldwide: data from the International Severe Asthma Registry (ISAR)	*CHEST*	2020	157(4)	790-804	10.1016/j.chest.2019.10.053	PDF PubMed
ISAR Delphi	Lakmini Bulathsinhala	Development of the International Severe Asthma Registry (ISAR): a modified Delphi study	*J Allergy Clin Immunol Pract*	2019	7(2)	578-588.e2	10.1016/j.jaip.2018.08.016.	PDF PubMed

Severe asthma in numbers

Last time data was released from the ISAR:

2020

[Asthma Original Research]

CHEST

Characterization of Severe Asthma Worldwide

Data From the International Severe Asthma Registry

Eileen Wang, MD, MPH; Michael E. Wechsler, MD; Trung N. Tran, MD, PhD; Liam G. Heaney, MD; Rupert C. Jones, MD; Andrew N. Menzies-Gow, MD; John Busby, PhD; David J. Jackson, MD, PhD; Paul E. Pfeffer, MD, PhD; Chin Kook Rhee, MD, PhD; You Sook Cho, MD, PhD; G. Walter Canonica, MD; Enrico Heffler, MD, PhD; Peter G. Gibson, D Med; Mark Hew, PhD; Matthew Peters, MD, PhD; Erin S. Harvey, PhD; Marianna Alacqua, MD, PhD; James Zangrilli, MD; Lakmini Bulathsinhala, MPH; Victoria A. Carter, BSc; Isha Chaudhry, MSc; Neva Eleangovan, BSc; Naeimeh Hosseini, MD; Ruth B. Murray, PhD; and David B. Price, MD

- Defined asthma as patients on Step 5 or Uncontrolled on Step 4
- 18 years or older
- Provided consent except in the US where data was de-identified
- Patient with ACO syndrome were not excluded

- 4990 participants

- Mean age of asthma onset was 30.7 (+/- 17.7 years)
    - 77.5% developed asthma after the age of 12
    - 34.4% developed it after the age of 40

Predominant sex?

Sex, No. (%) (n = 4,986)	
Female	2,957 (59.3)
Male	2,029 (40.7)

Age brackets?

Age, y (n = 4,967)	
Mean (SD)	55.0 (15.9)
18-34, No. (%)	658 (13.2)
35-54, No. (%)	1,510 (30.4)
55-79, No. (%)	2,588 (52.1)
≥ 80, No. (%)	211 (4.2)

Ethnicity?

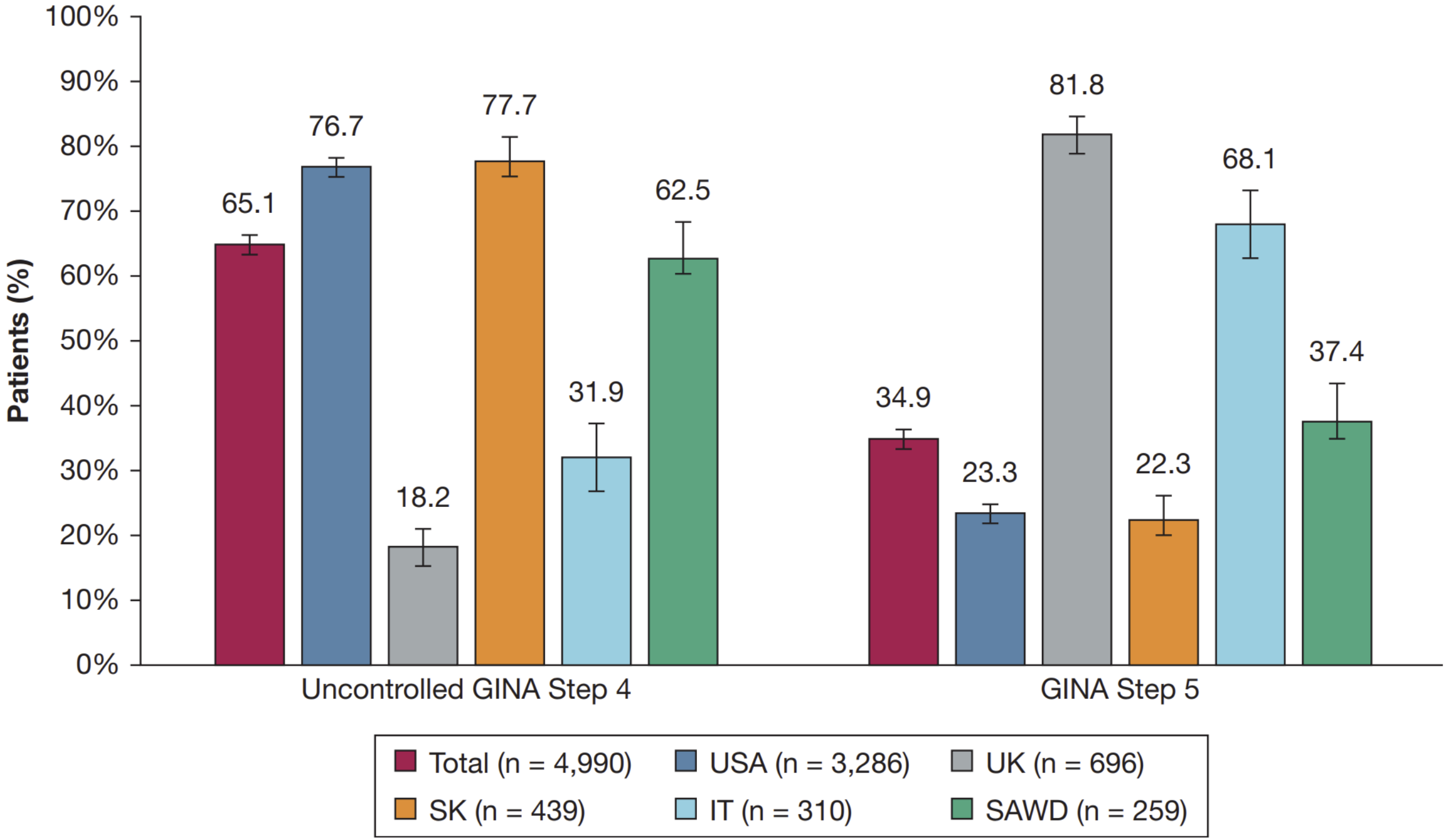
Ethnicity, No. (%) (n = 4,912)	
White	3,568 (72.6)
Asian	589 (12.0)
African	263 (5.4)
Mixed	31 (0.6)
Other	130 (2.6)
Unknown	331 (6.7)

Effect of weight?

BMI, No. (%), kg/m^2 ($n = 4,901$)	
Underweight (< 18.5)	105 (2.1)
Normal (≥ 18.5 to < 25)	1,345 (27.4)
Overweight (≥ 25 to < 30)	1,531 (31.2)
Obese (≥ 30)	1,920 (39.2)

Smoking status?

Smoking status, No. (%) (n = 4,947)	
Current smoker	294 (5.9)
Exsmoker	1,656 (33.5)
Never smoked	2,997 (60.6)


Patients (%)
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
65.1
76.7
18.2
77.7
31.9
62.5
34.9
23.3
81.8
22.3
68.1
37.4
Uncontrolled GINA Step 4
GINA Step 5
Total (n = 4,990)
USA (n = 3,286)
UK (n = 696)
SK (n = 439)
IT (n = 310)
SAWD (n = 259)

Pulmonary function tests

Country or Registry	Uncontrolled Asthma at GINA Step 4					
	Prebronchodilator			Postbronchodilator		
	FEV_1 (SD)	FVC (SD)	FEV_1/FVC (SD)	FEV_1 (SD)	FVC (SD)	FEV_1/FVC (SD)
All	71.9 (15.3) (n = 2,801)[a]	78.7 (14.9) (n = 2,936)	0.69 (0.12) (n = 2,633)	75.6 (16.0) (n = 2,104)	81.8 (14.6) (n = 2,501)	0.71 (0.13) (n = 1,755)
United States	72.3 (13.7) (n = 2,244)	78.2 (14.1) (n = 2,382)	0.70 (0.11) (n = 2,512)	75.8 (14.1) (n = 1,591)	81.4 (13.6) (n = 1,639)	0.71 (0.13) (n = 1,732)
United Kingdom	72.5 (22.3) (n = 117)	85.2 (17.8) (n = 114)	…[b]	77.5 (22.5) (n = 73)	91.5 (18.1) (n = 71)	…[b]
South Korea	68.1 (20.1) (n = 341)	76.7 (18.0) (n = 341)	0.6 (0.16) (n = 12)	73.8 (21.1) (n = 341)	81.9 (18.2) (n = 341)	0.62 (0.17) (n = 12)
Italy	74.2 (20.5) (n = 99)	91.5 (18.8) (n = 99)	0.65 (0.11) (n = 109)	77.1 (19.1) (n = 99)	…[c]	0.59 (0.14) (n = 11)

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	GINA Step 5					
All	70.4 (19.0) (n = 1,437)[a]	82.5 (17.3) (n = 1,484)	0.68 (0.12) (n = 1,045)	76.2 (19.2) (n = 975)	84.5 (17.3) (n = 775)	0.69 (0.13) (n = 530)
United States	74.9 (15.8) (n = 625)	80.1 (15.3) (n = 688)	0.69 (0.11) (n = 740)	75.5 (15.6) (n = 390)	82.1 (14.2) (n = 413)	0.69 (0.13) (n = 445)
United Kingdom	65.2 (22.0) (n = 503)	84.5 (20.4) (n = 487)	…[b]	71.1 (21.9) (n = 276)	89.9 (20.5) (n = 264)	…[b]
South Korea	68.0 (20.7) (n = 98)	77.5 (19.0) (n = 98)	0.60 (0.13) (n = 8)	72.1 (21.4) (n = 98)	80.4 (19.8) (n = 98)	0.63 (0.15) (n = 8)
Italy	70.7 (18.8) (n = 211)	88.3 (18.4) (n = 211)	0.66 (0.13) (n = 297)	86.0 (20.5) (n = 211)	…[c]	0.68 (0.14) (n = 77)

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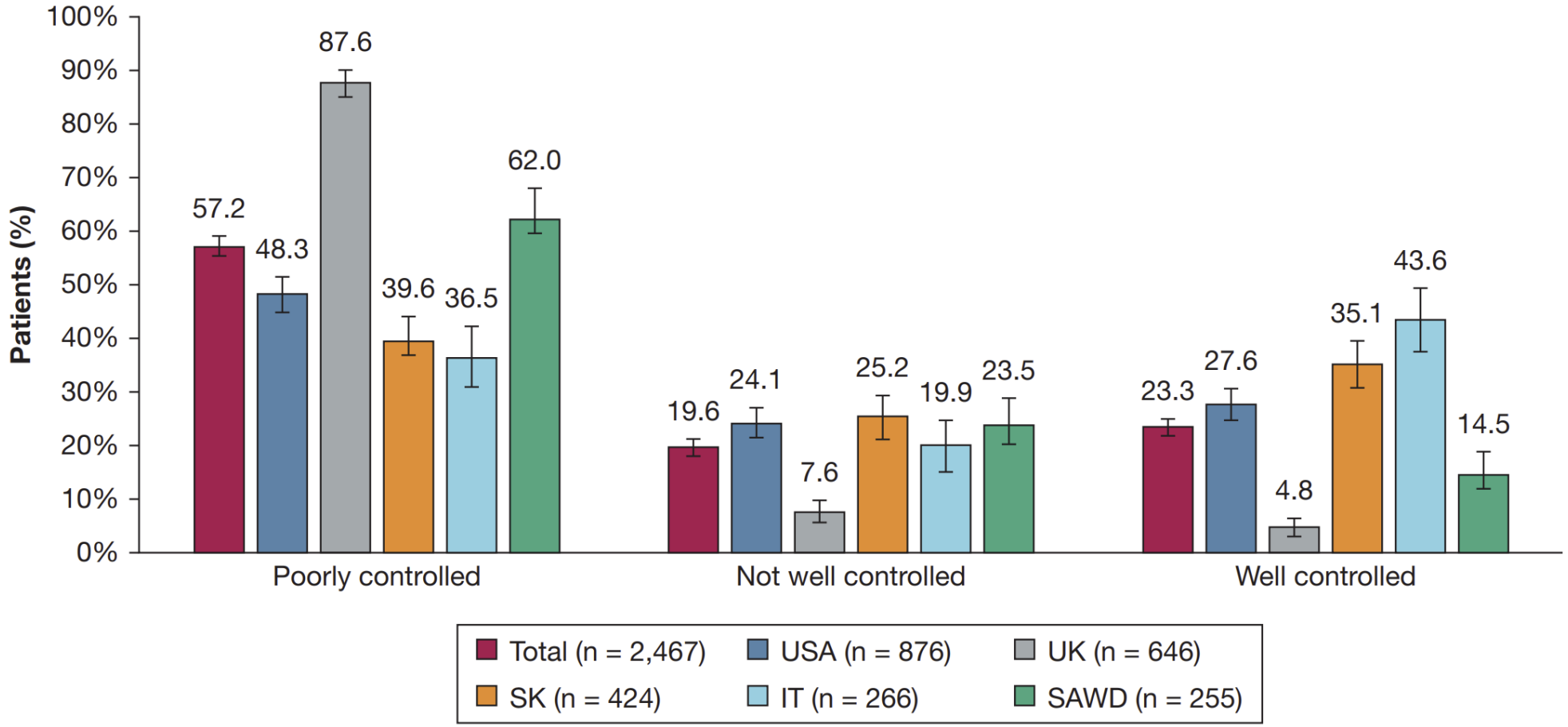
- FEV1 and FVC did not correlate with severity of disease

- There was little improvement post-bronchodilator
    - Substantial presence of fixed airway obstruction

Asthma control



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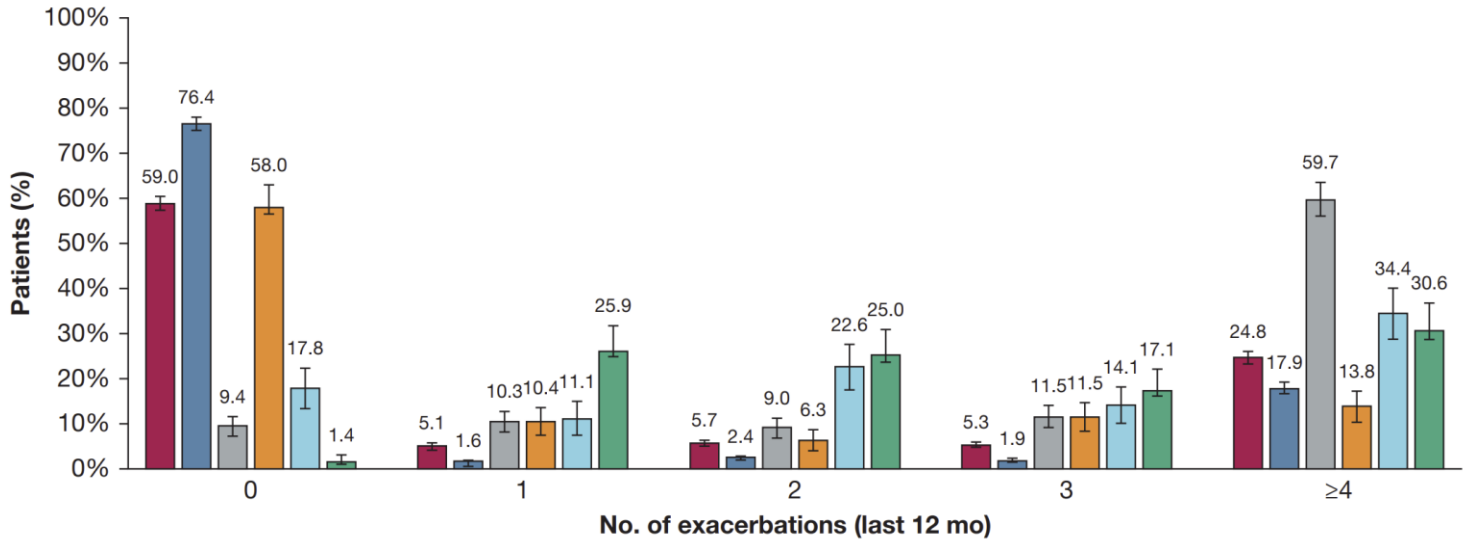
Exacerbations

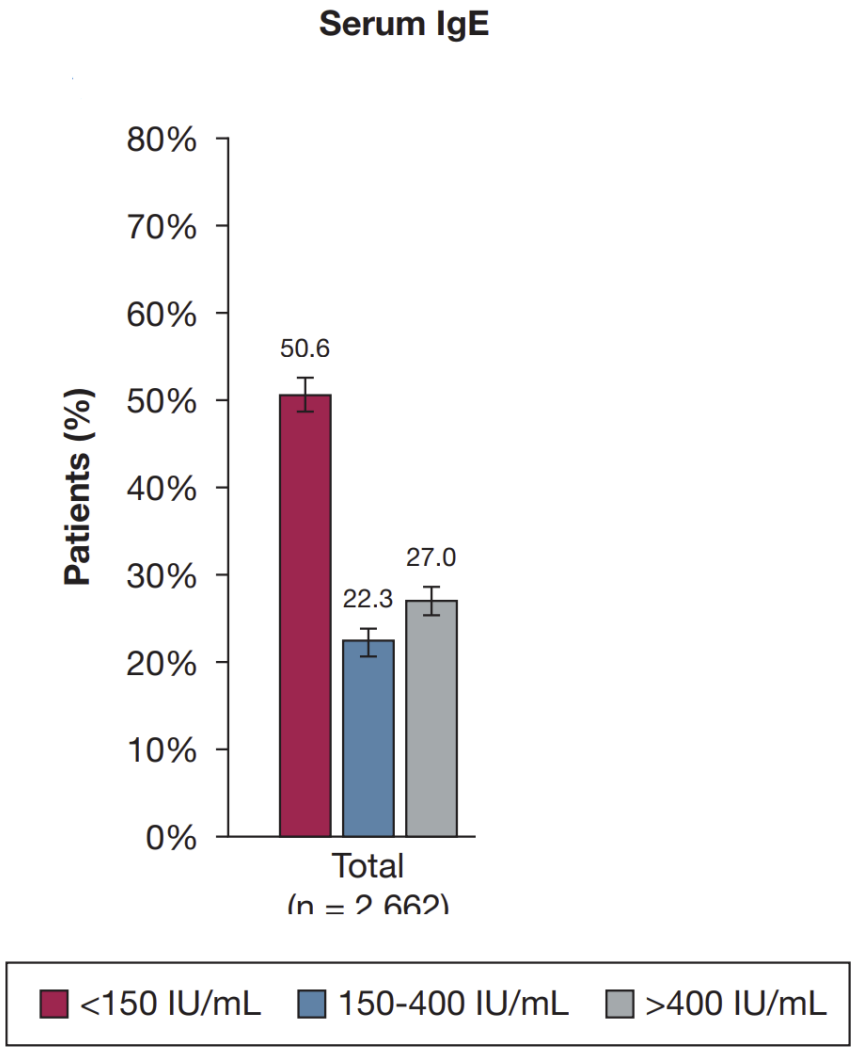
- Exacerbations correlated with severity
  - Mean number of exacerbations per year was 1.7
  - 25% of patients had 4 or more exacerbations per year
  - Significantly more exacerbations in patients at GINA step 5



Total IgE level

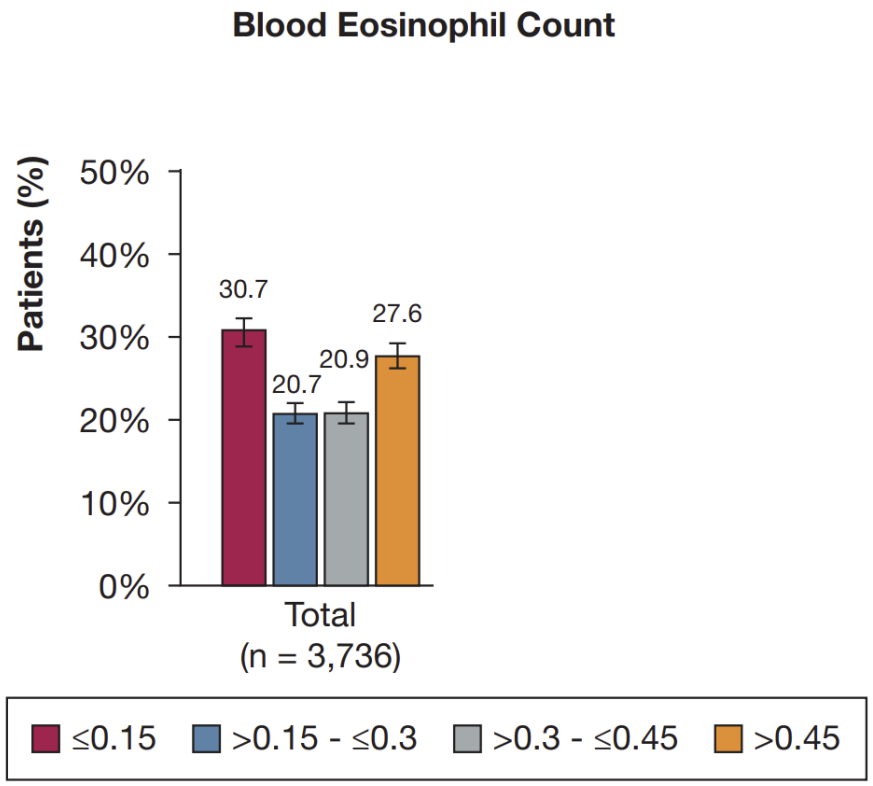
- IgE was lower in uncontrolled GINA step 4 and higher in GINA step 5

- More women had low IgE levels, more men had high IgE levels



Blood eosinophil count

- 48.5% of patients had a BEC > 0.3 x 10^9/L
- Significant variability between countries



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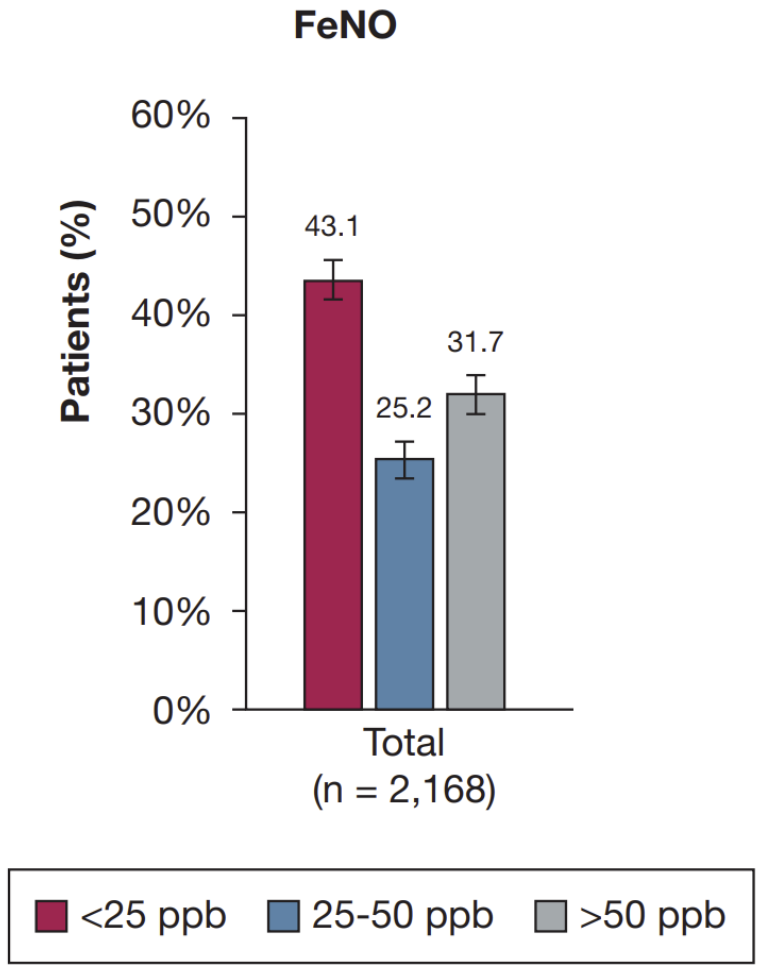
FeNO
Patients (%)
60%
50%
40%
30%
20%
10%
0%
43.1
25.2
31.7
Total
(n = 2,168)
<25 ppb
25-50 ppb
>50 ppb

Most common Comorbidities

- Allergic rhinitis 49.4%
- Chronic rhinosinusitis 21.4%
- Eczema 9.6%
- Nasal Polyps 7.3%

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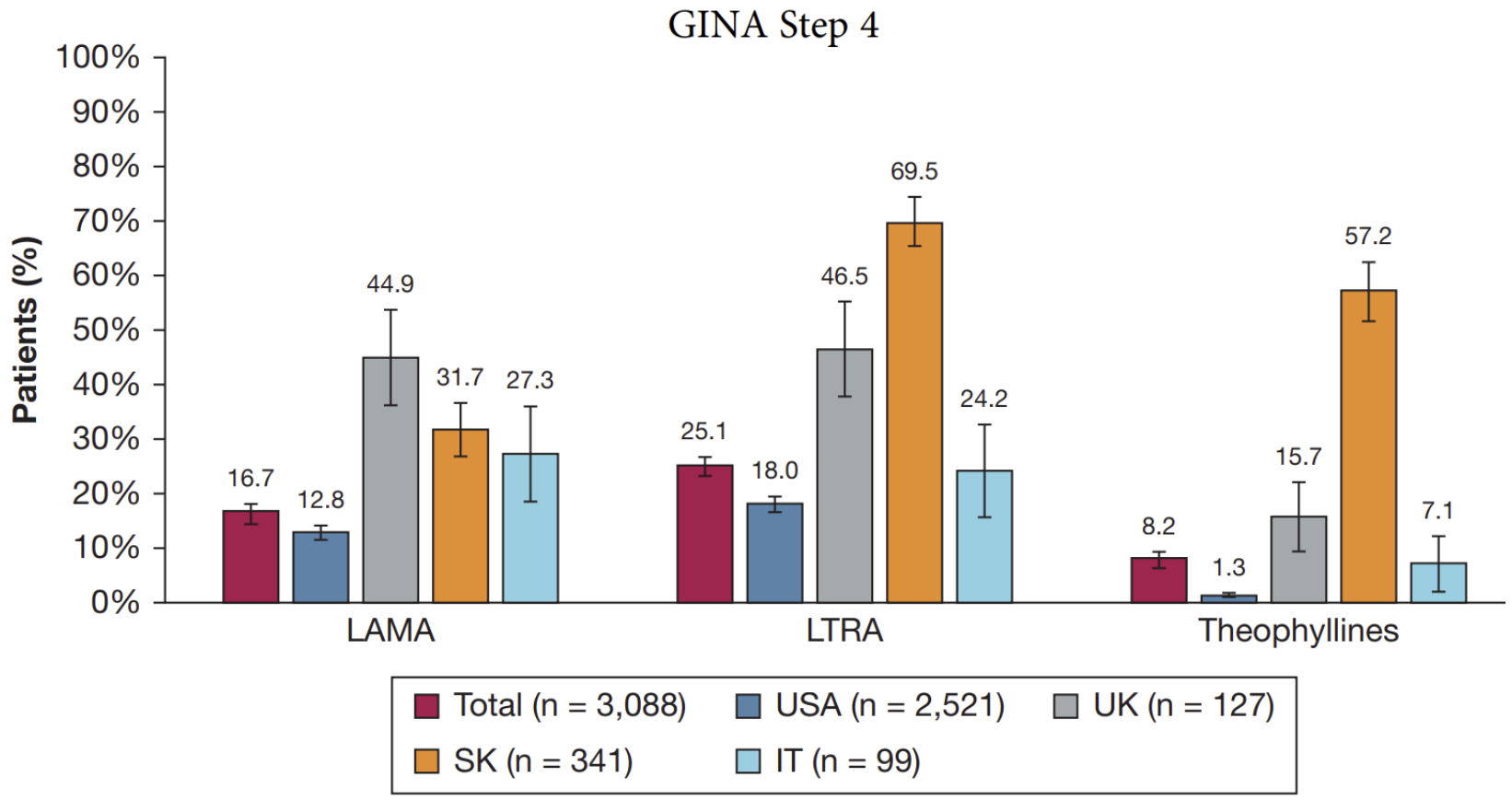
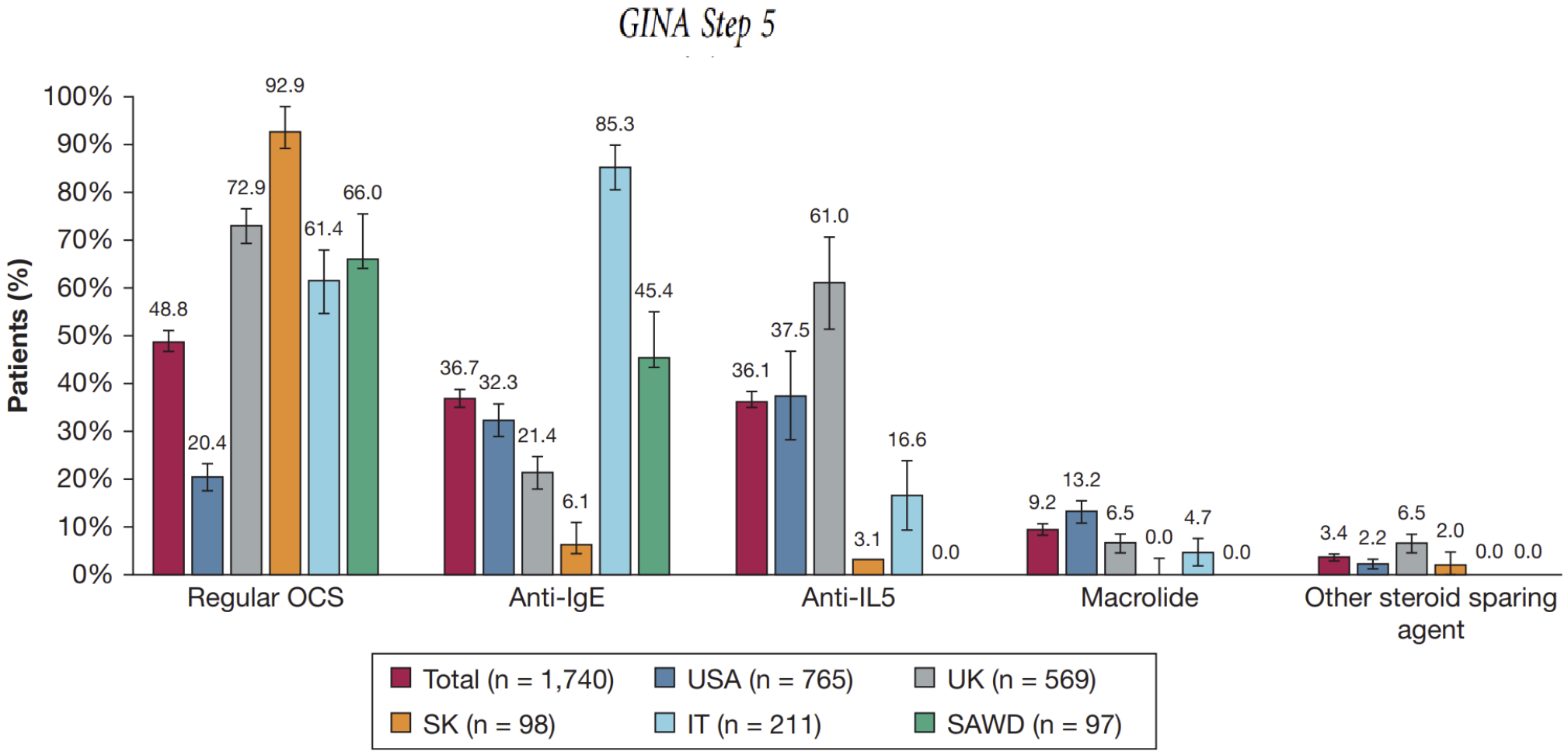
Treatment – Uncontrolled GINA step 4



Treatment – GINA Step 5



Summary

- The international severe asthma population in 2020 predominantly:
  - Was Female
  - Was Overweight or Obese
  - Was in the 55-79 age range
  - Had 1.7 exacerbations per year
  - Had poorly controlled or not well controlled asthma
  - Had low FEV1/FVC and poor reversibility
  - Had Allergic Rhinitis as a comorbidity

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LEBANON
AKKAR
Halba
TRIPOLI
Miniyeh
Zgharta
Miniyeh-
Danniyeh
Hermel
Hermel
Koura
NORTH
Zgharta
Amioun
Batrun
Bsharri
Bsharri
Batrun
BAALBEK-HERMEL
Byblos
Jbeil
Baalbek
Keserwan
Baalbek
Jounieh
MOUNT
LEBANON
BEIRUT
Matn
Jdeideh
Baabda
Zahlé
Baabda
Zahlé
Aley
Aley
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Chouf
Joub Jannine
Western
Beqaa
Rashaya
Jezzine
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Hasbaya
NABATIEH
Tyre
SOUTH
Marje-
youn
Tyre
Bint Jbeil
Bint Jbeil

The power of registries

3 Cite Share

The **Power** of Large Clinical Databases and **Registries** in our Understanding of Cardiovascular Diseases.

Bax JJ, Chandrashekhar Y.

JACC Cardiovasc Imaging. 2021 Nov;14(11):2272-2274. doi: 10.1016/j.jcmg.2021.10.001.

PMID: 34736602 **Free article.** No abstract available.

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Pharmacol Res. 2019 Oct;148:104410. doi: 10.1016/j.phrs.2019.104410. Epub 2019 Aug 25.

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Webb A.

JAMA Neurol. 2018 Nov 1;75(11):1311-1312. doi: 10.1001/jamaneurol.2018.1853.

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knowledge
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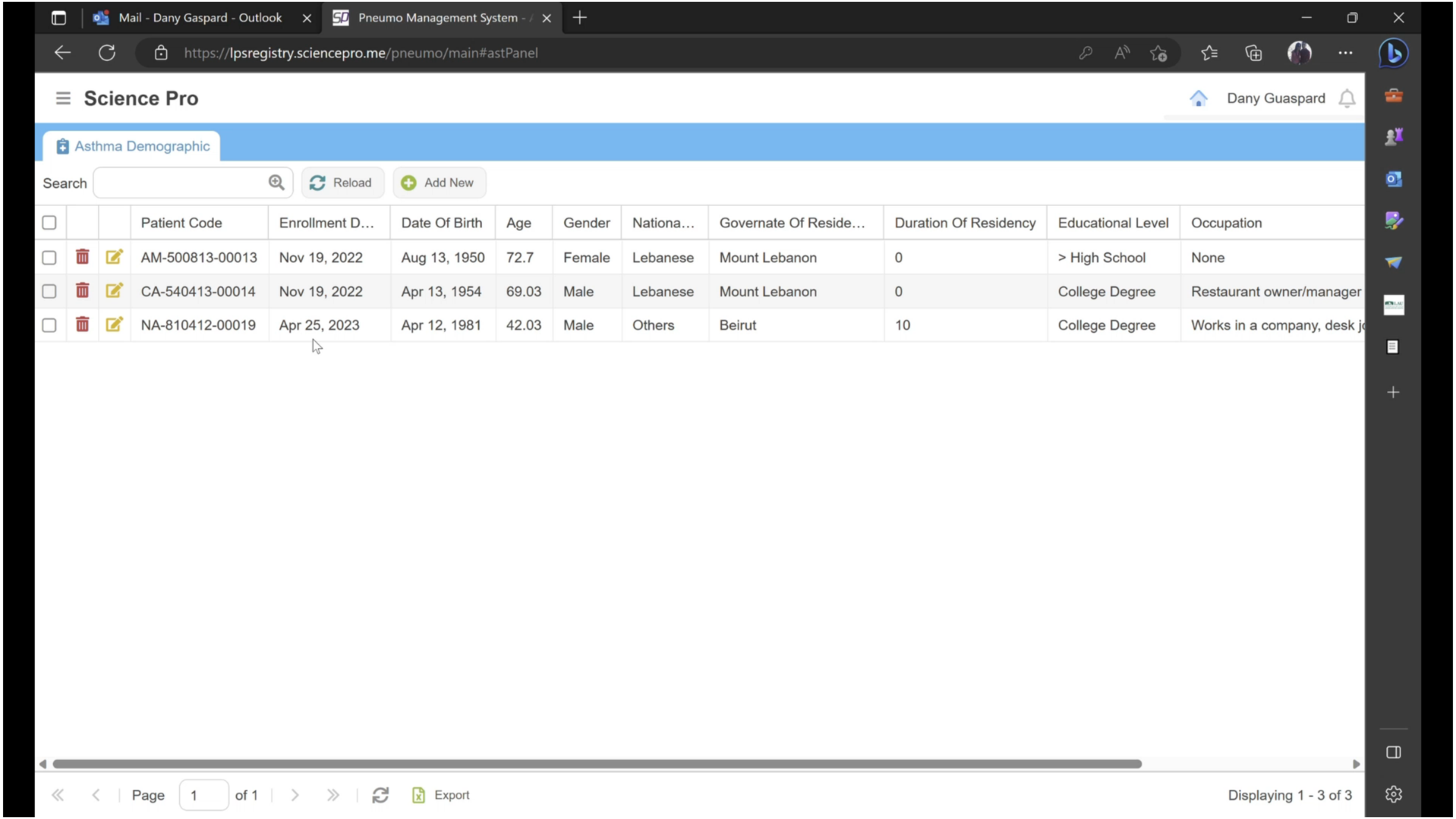
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Patient Code
Enrollment D…
Date Of Birth
Age
Gender
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Governate Of Reside…
Duration Of Residency
Educational Level
Occupation
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Aug 13, 1950
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Lebanese
Mount Lebanon
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> High School
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Apr 13, 1954
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College Degree
Restaurant owner/manager
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Apr 25, 2023
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