

## Cross-Country Comparison of Demographic and Clinical Characteristics of Patients Managed in Severe Asthma Services across UK, USA, Australia, South Korea, and Italy.

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**Rationale:** The International Severe Asthma Registry (ISAR; <http://isaregistries.org/>) is the first initiative to study the epidemiology of adult severe asthma worldwide. This study reports the distribution of clinical and demographic characteristics of adult severe asthma patients across the initial five participating registries and 7 countries.

**Methods:** ISAR retrospectively and prospectively collects data on severe asthma patients from secondary and tertiary care. It includes patients  $\geq 18$  years' old, receiving GINA Step 5 treatment or uncontrolled on GINA Step 4. Baseline aggregate data from the UK, Italy, South Korea (SK) and the SAWD registry (including Australia, Singapore and New Zealand), and individual data from the USA from December 2014 to December 2017 were used to report demographic and clinical characteristics across countries.

**Results:** Of 4,990 patients included in the study, severe asthma was slightly more prevalent in women in both uncontrolled GINA Step 4 (59.3%) and Step 5 patients (59.4%). Asthma was most severe in cohorts from the UK (81.8%) and Italy (68.1%), with most patients on GINA Step 5. SK had the oldest, and UK had the youngest cohort of severe asthma patients. The majority of patients in the UK, USA and the SAWD registry were overweight/obese. SAWD registry patients had the earliest mean age of asthma onset (22.7 (17.1)), while SK had the latest (41(17.1)). The majority of patients in the UK (87.6%) and SAWD registry (62.0%) reported poor asthma control. Mean number of exacerbations (last 12 months) at baseline was lowest in the USA (0.8(1.6)) and highest in the UK (5 (4)). Severe asthma patients in Italy and UK were predominantly found in the highest ( $>0.45 \times 10^9$  cells/L) blood eosinophil count category. In contrast, one-third of patients in SK, USA and the SAWD registry had low ( $\leq 0.15 \times 10^9$  cells/L) blood eosinophil levels. Most UK patients had high fractional exhaled nitric oxide (FeNO) concentration ( $>50$  ppb). Maintenance oral corticosteroid use was highest among severe asthma patients in the UK. Biologic therapy was predominantly prescribed in Italy and UK.

Country	GINA		Age (Mean/SD)	Overweight/Obese	Age of Asthma Onset (Mean/SD)	Poorly Controlled Asthma	Exacerbations (Mean/SD)	Blood Eosinophil count (x 10 <sup>9</sup> /L)		High FeNO (>50ppb)	Maintenance OCS	Biologics (Anti-IgE/Anti-IL5)
	Uncontrolled Step-4	Step-5						≤0.15	>0.45			
SAWD* (N=259)	62.5%	37.4%	55.1 (15.3)	80.6%	22.7 (17.1)	62.0%	3.3 (2.9)	31.0%	26.2%	19.8%	24.7%	17.0%
Italy (N=310)	30.3%	69.3%	54.5 (13.8)	54.6%	34.4 (17.1)	36.5%	3.7 (7.2)	20.0%	38.3%	35.0%	37.9%	69.3%
South Korea (N=439)	77.7%	22.3%	62.4 (14.1)	35.1%	41.0 (17.1)	39.6%	1.1 (1.5)	35.7%	28.3%	31.5%	20.7%	1.4%
UK (N=696)	18.2%	81.8%	48.3 (14.1)	78.2%	25.4 (18.7)	87.6%	5.0 (4.0)	22.8%	37.6%	45.4%	59.6%	67.3%
USA (N=3,286)	76.7%	23.3%	55.5 (16.7)	74.2%	N/A	48.3%	0.8 (1.6)	33.4%	23.4%	27.2%	23.3%	16.2%

\*N=225 from Australia, N=16 from Singapore, and N=18 from New Zealand

Note: Within each country the 'N' varies for each parameter assessed.

**Conclusion:** Some of the substantial variation in demographic and clinical characteristics of severe asthma patients across countries is likely a reflection of differences in organisation of severe asthma referral centers, associated referral patterns and requirements for reimbursement of newer asthma therapies. Contextualising results within country-specific health systems should be conducted next. This diverse population of severe asthma patients provides substantial opportunity for research.

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