Approaches to the assessment of the risks associated with the health of flight crews. The prevalence of various diseases depending on sex, age, region of residence among the pilots of the European Union Civil Aviation

Dr. Declan Maher, ESAM, Medical Assessor (Ireland)

Declaration

- Primary Care Physician, Senior Partner 0.8 FTE
- Medical Assessor IAA 0.5 FTE
- Aeromedical Examiner
- European Society of Aerospace Medicine (ESAM) co-opted EC member
- European Chief Medical Officers Forum (Secretary)

Disclosure

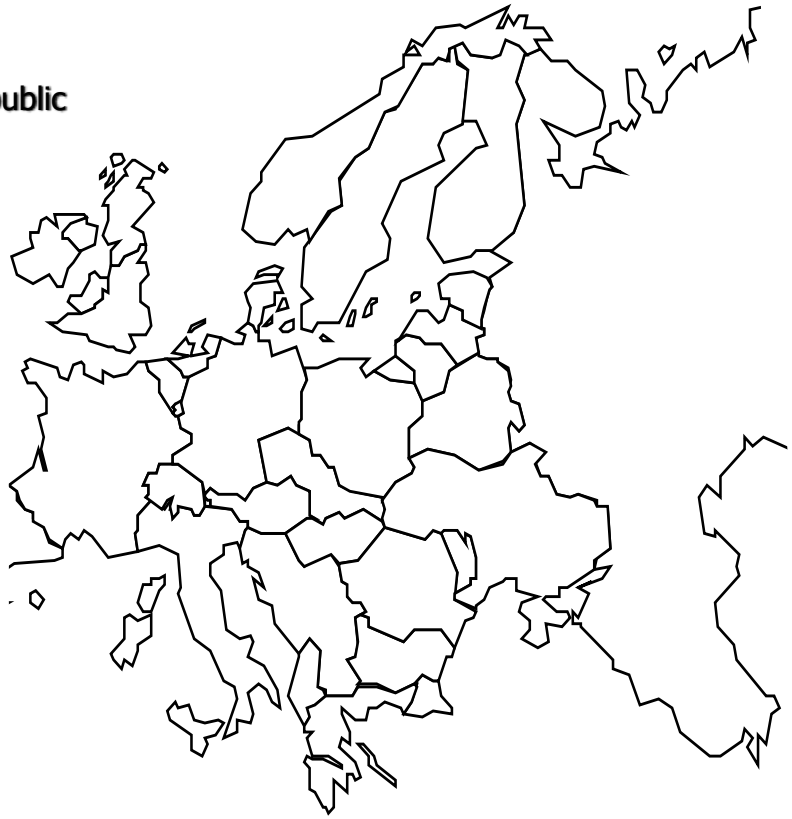
- Part-time employee of the Irish Aviation Authority.
- No financial disclosures to report
- No Conflict of Interest
- No use of off-licence products
- Opinions expressed are my own

Background
European Legal Codes

- French Civil Law
- German Civil Law
- Scandinavian Civil Law
- Italian Civil Law
- Swiss Civil Law
- Anglo-Saxon Common Law

Authorities represented on the FCL-MSC

- Belgium
- Croatia
- Czech Republic
- Denmark
- Estonia
- Finland
- Austria
- France
- Germany
- Greece
- Hungary
- Iceland
- Ireland
- Italy



- Latvia
- Lithuania
- Luxembourg
- Malta
- Moldova
- Netherlands
- Norway
- Poland
- Portugal
- Rumania
- Slovenia
- Spain
- Sweden
- Switzerland
- Turkey
- United Kingdom

JAA

- Started in 1969
- Status:
- Co-operative body for aviation safety
- No delegation of legal powers

EASA

- Started 28 September 2003
- Status:
- European Union Agency
  - legal personality
  - implementing powers conferred to it by the Regulation

- Legal Framework:
- Basic Regulation
- Implementing Rules
- Acceptable Means of Compliance
  - Alternative Means of Compliance
- Guidance Material

Risk Assessment

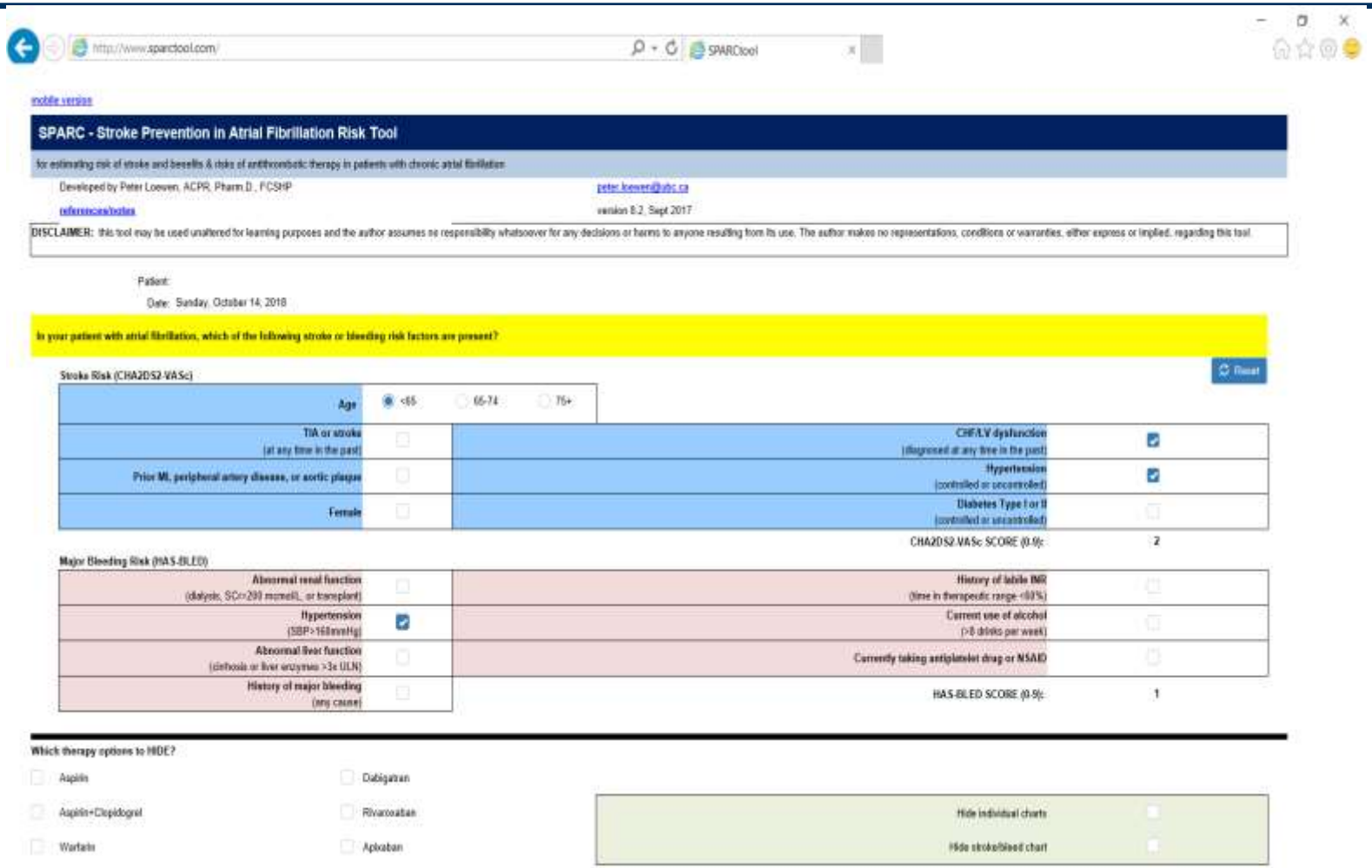
- Class 1 Medical Certificates
- 1% risk of incapacitation
- Multi-Crew Operations
- 2% risk of incapacitation

- Class 2 Medical Certificates
- 2% risk unrestricted
- 5% restricted

AltMoC

- Use of DOACs
- Colour Vision and the Colour Assessment and Diagnosis TEST (CAD, City of London University)
- Insulin Treated Diabetic Pilots. (ARA.MED.330)

SPARCtool.com DOACs



http://www.sparctool.com/ SPARCtool

mobile version

SPARC - Stroke Prevention in Atrial Fibrillation Risk Tool

for estimating risk of stroke and benefits & risks of antithrombotic therapy in patients with chronic atrial fibrillation

Developed by Peter Loewen, ACPR, Pharm.D., FCSHP — peter.loewen@ubc.ca

references/notes — version 8.2, Sept 2017

DISCLAIMER: this tool may be used unaltered for learning purposes and the author assumes no responsibility whatsoever for any decisions or harms to anyone resulting from its use. The author makes no representations, conditions or warranties, either express or implied, regarding this tool

Patient:

Date: Sunday, October 14, 2018

Is your patient with atrial fibrillation, which of the following stroke or bleeding risk factors are present?

Reset

Stroke Risk (CHA2DS2-VASc)

Age	◉ <65	○ 65-74	○ 75+		
TIA or stroke (at any time in the past)	☐		CHF/LV dysfunction (diagnosed at any time in the past)	☑	
Prior MI, peripheral artery disease, or aortic plaque	☐		Hypertension (controlled or uncontrolled)	☑	
Female	☐		Diabetes Type I or II (controlled or uncontrolled)	☐	
			CHA2DS2-VASc SCORE (0-9):	2	

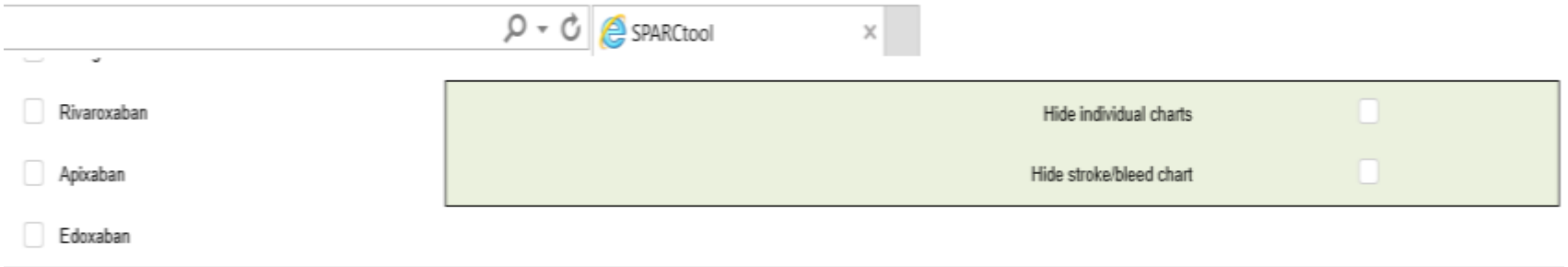
Major Bleeding Risk (HAS-BLED)

Abnormal renal function (dialysis, SCr>200 mcmol/L, or transplant)	☐		History of labile INR (time in therapeutic range <60%)	☐	
Hypertension (SBP>160mmHg)	☑		Current use of alcohol (>8 drinks per week)	☐	
Abnormal liver function (cirrhosis or liver enzymes >3x ULN)	☐		Currently taking antiplatelet drug or NSAID	☐	
History of major bleeding (any cause)	☐		HAS-BLED SCORE (0-9):	1	

Which therapy options to HIDE?

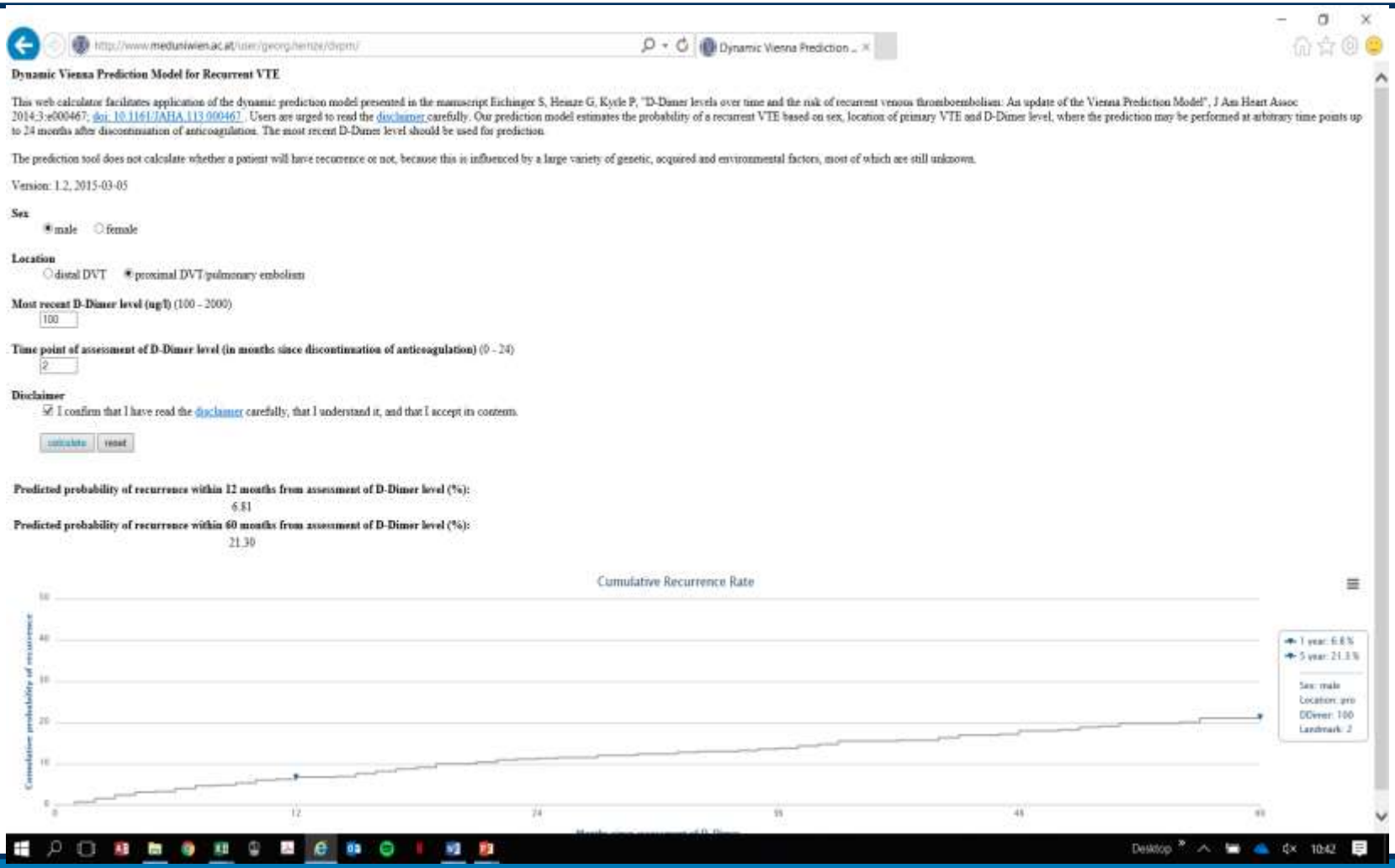
☐ Aspirin	☐ Dabigatran	Hide individual charts	☐
☐ Aspirin+Clopidogrel	☐ Rivaroxaban	Hide stroke/bleed chart	☐
☐ Warfarin	☐ Apixaban		

SPARCtool.com DOACs



	PERCENT PER YEAR	
	annual risk of **stroke/embolism**	annual risk of **major bleeding** (intracranial bleeding, bleeding requiring hospitalization, HgB decrease of > 20 g/L, or need for transfusion secondary to bleeding)
NO THERAPY	2.9%	0.6%
ASPIRIN	2.3%	1.1%
ASPIRIN+CLOP	1.6%	2.2%
WARFARIN	1.0%	2.2%
DABIGATRAN 110	1.0%	1.8%
DABIGATRAN 150	0.6%	2.2%
RIVAROXABAN	1.0%	2.2%
APIXABAN	0.8%	1.5%
EDOXABAN 30	1.0%	1.0%
EDOXABAN 60	1.0%	1.8%

Vienna VTE recurrence Risk Tool DOACs



Dynamic Vienna Prediction Model for Recurrent VTE

This web calculator facilitates application of the dynamic prediction model presented in the manuscript Eichinger S, Heinze G, Kyrle P, "D-Dimer levels over time and the risk of recurrent venous thromboembolism: An update of the Vienna Prediction Model", J Am Heart Assoc 2014;3:e000467; doi: 10.1161/JAHA.113.000467 . Users are urged to read the disclaimer carefully. Our prediction model estimates the probability of a recurrent VTE based on sex, location of primary VTE and D-Dimer level, where the prediction may be performed at arbitrary time points up to 24 months after discontinuation of anticoagulation. The most recent D-Dimer level should be used for prediction.

The prediction tool does not calculate whether a patient will have recurrence or not, because this is influenced by a large variety of genetic, acquired and environmental factors, most of which are still unknown.

Version: 1.2, 2015-03-05

Sex

◉ male ○ female

Location

○ distal DVT ◉ proximal DVT/pulmonary embolism

Most recent D-Dimer level (ug/l) (100 - 2000)

100

Time point of assessment of D-Dimer level (in months since discontinuation of anticoagulation) (0 - 24)

2

Disclaimer

☑ I confirm that I have read the disclaimer carefully, that I understand it, and that I accept its contents.

calculate reset

Predicted probability of recurrence within 12 months from assessment of D-Dimer level (%):

6.81

Predicted probability of recurrence within 60 months from assessment of D-Dimer level (%):

21.30

Cumulative Recurrence Rate

Colour Vision Assessment
MED.B.075 Colour vision

- (a) Applicants shall be required to demonstrate the ability to perceive readily the colours that are necessary for the safe performance of duties.
- (b) *Examination*
- (1) Applicants shall pass the Ishihara test for the initial issue of a medical certificate.
- (2) Applicants who fail to pass in the Ishihara test shall undergo further colour perception testing to establish whether they are colour safe.
- (c) In the case of Class 1 medical certificates, applicants shall have normal perception of colours or be colour safe. Applicants who fail further colour perception testing shall be assessed as unfit. Applicants for a Class 1 medical certificate shall be referred to the licensing authority.

AMC1 MED B.075 Colour vision

- (a) At revalidation, colour vision should be tested on clinical indication.
- (b) The Ishihara test (24 plate version) is considered passed if the first 15 plates, presented in a random order, are identified without error.
- (c) Those failing the Ishihara test should be examined either by:
  - (1) anomaloscopy (Nagel or equivalent). This test is considered passed if the colour match is trichromatic and the matching range is 4 scale units or less; or by
- (2) lantern testing with a Spectrolux, Beynes or Holmes-Wright lantern. This test is considered passed if the applicant passes without error a test with accepted lanterns.

Insulin Treated Diabetic Pilot Protocol

Disease Prevalence

Background

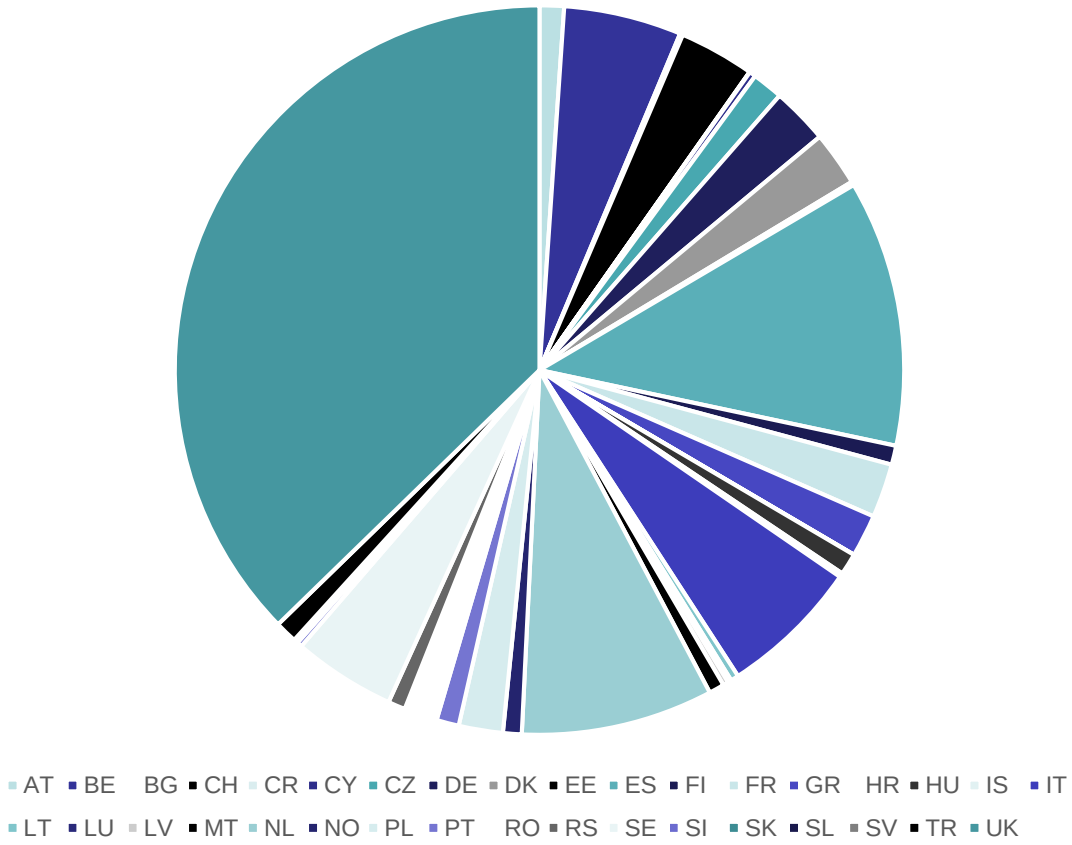
- Pre 2013 State of Licence Issue
  - National Law, National Licence
  - Medical Records remain where examined.

- Post 2013 State of Licence Issue
  - Pilot/Operator choice
  - Medical Records transfer to State of Licence Issue

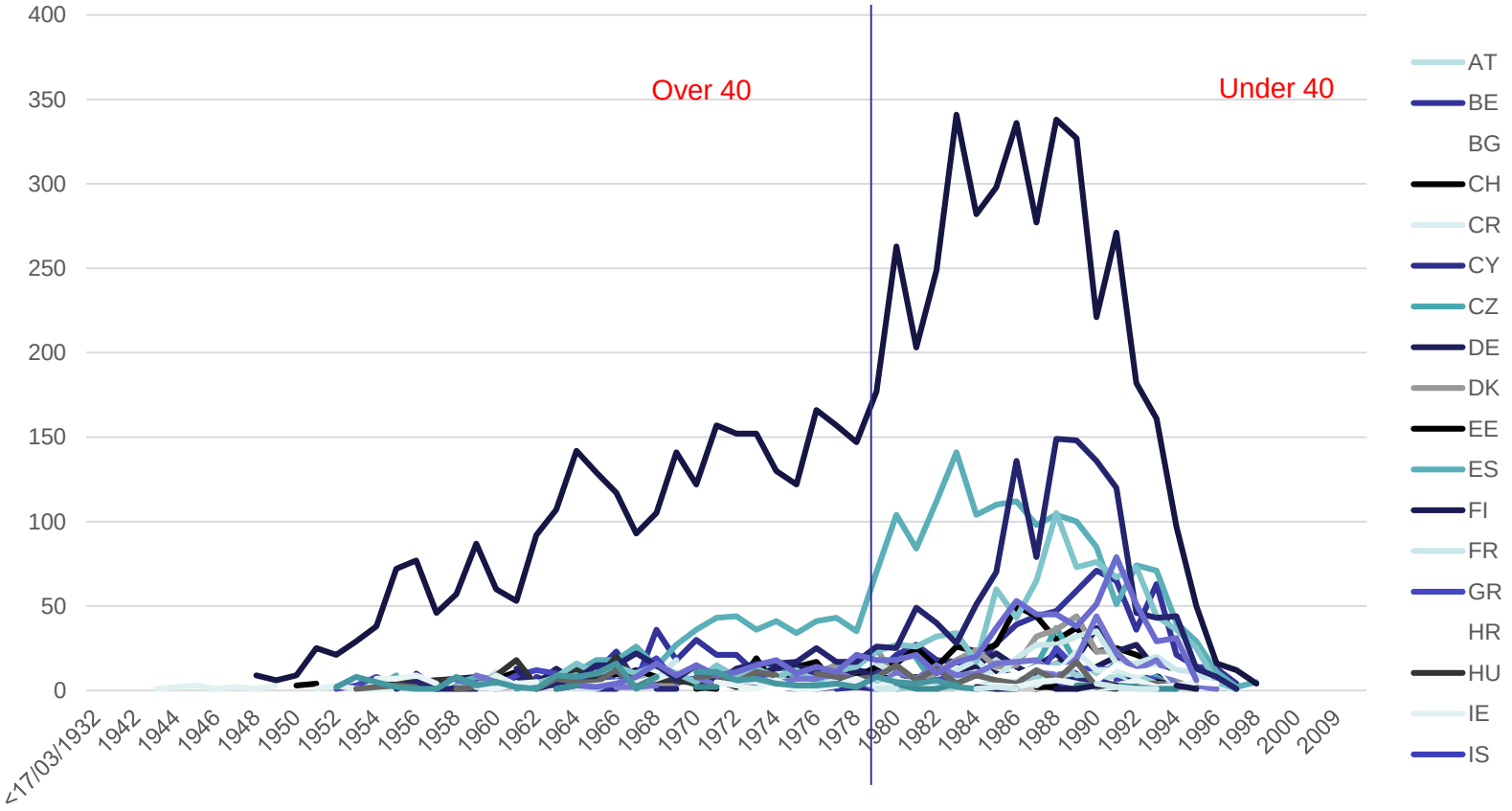
Methods

- Number of Medical Reports 18,863
- Period 2014-2017
- Class 1 Medical Certificates
- 35 States: European Union and Iceland, Norway and Switzerland
- 1003 AMEs

Medical Reports from Europe, not IE



Age Profile Medical Certificates non-Irish



Prevalence of Pathology in Irish Pilots on revalidation/renewal assessments 2017

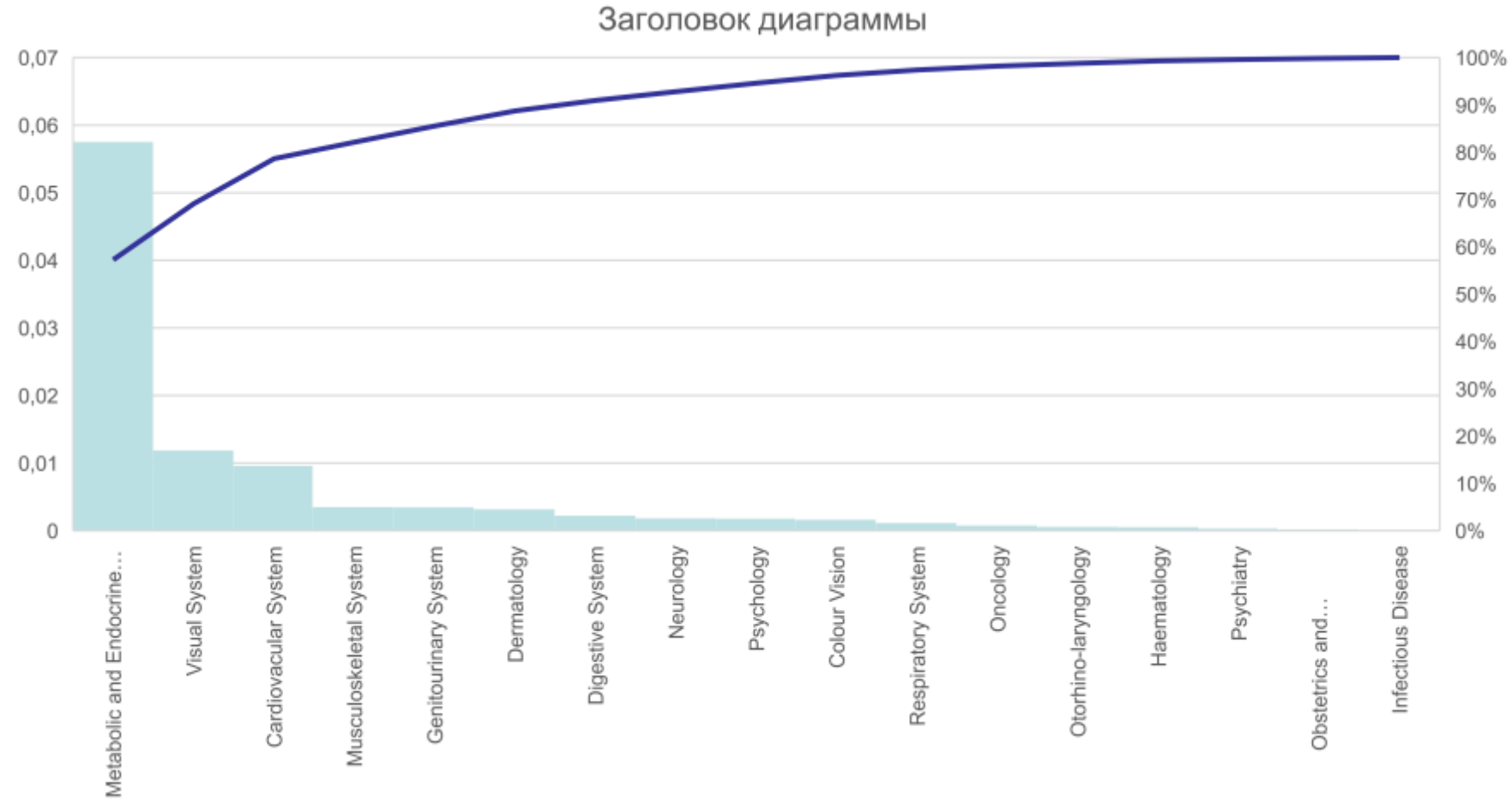
Row Labels	Count of Assessor	n=2712
Cardiology	6	0.2%
Digestive	4	0.1%
Infectious Disease	1	0.0%
Metabolic and Endocrine	212	7.8%
Musculoskeletal	1	0.0%
Neurology	3	0.1%
Obstetrics & Gynaecology	2	0.1%
Oncology	3	0.1%
Otorhinolaryngology	3	0.1%
Psychiatry	1	0.0%
Psychology	2	0.1%
Visual	9	0.3%
(blank)	226	8.3%
Grand Total	473	17.4%

7.8%

Pathology at regular assessments(EU) not IE

Part-MED Category		
Cardiovacular System	0.96%	0.96%
Respiratory System		0.12%
Digestive System		0.22%
Metabolic and Endocrine System	5.75%	5.75%
Haematology		0.05%
Genitourinary System		0.34%
Infectious Disease		0.02%
Obstetrics and Gynaecology		0.02%
Musculoskeletal System		0.35%
Psychiatry		0.03%
Psychology		0.18%
Neurology		0.19%
Visual System	1.19%	1.19%
Colour Vision		0.16%
Otorhino-laryngology		0.06%
Dermatology		0.32%
Oncology		0.08%
None		89.96%
Total		100.00%

Pathology at regular assessments(EU) not IE



Top 6 States

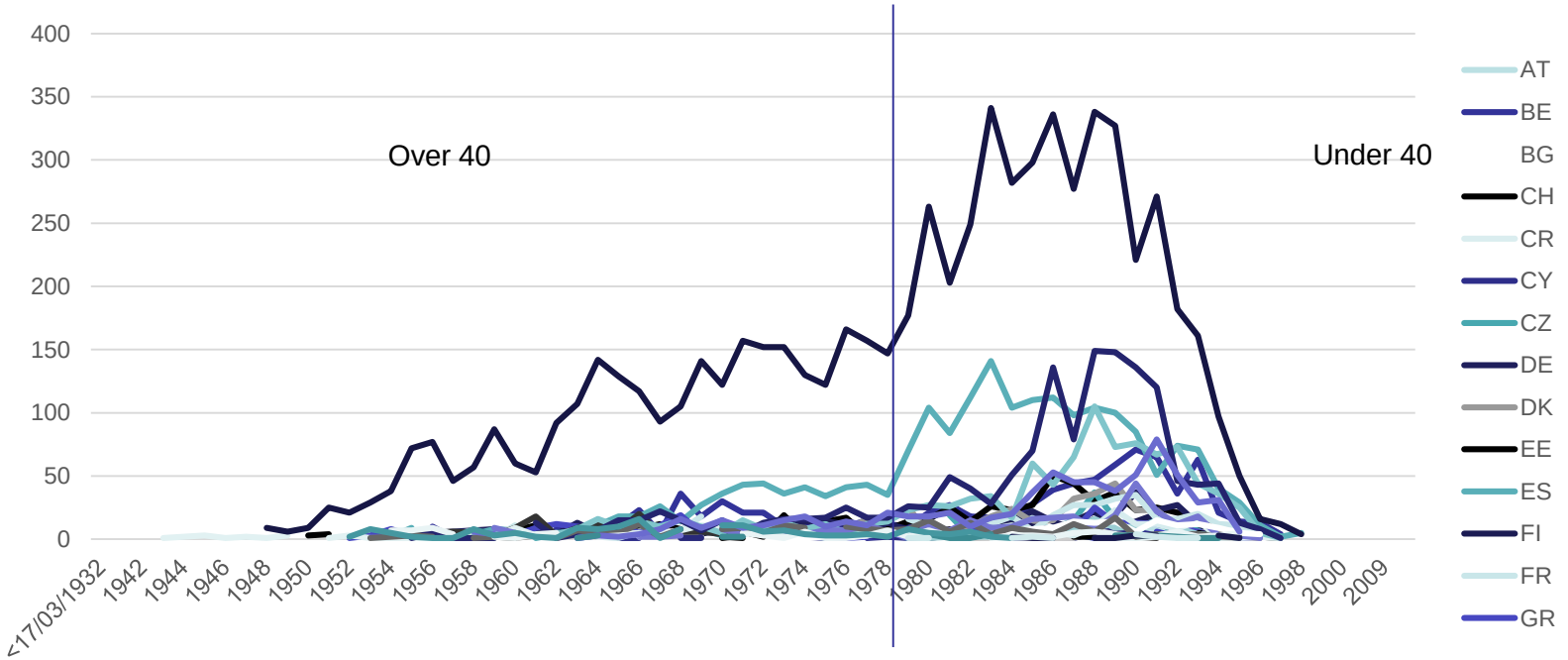
Pathology at regular assessments(EU) not IE

Part-MED Category	Total		UK		NL		IT		ES		BE		SE	
None	16671	90.53%	6029	85.87%	1376	92.72%	1010	97.87%	1909	93.08%	844	91.44%	734	96.20%
Unclear	14	0.08%	8	0.11%	1	0.07%		0.00%	1	0.05%		0.00%	1	0.13%
Cardiovacular System	158	0.86%	107	1.52%	3	0.20%		0.00%	3	0.15%	9	0.98%	2	0.26%
Dermatology	10	0.05%	9	0.13%		0.00%	1	0.10%		0.00%		0.00%		0.00%
Digestive System	40	0.22%	19	0.27%	3	0.20%		0.00%	5	0.24%	3	0.33%	2	0.26%
Genitourinary System	60	0.33%	34	0.48%	3	0.20%		0.00%	6	0.29%	3	0.33%	1	0.13%
Haematology	10	0.05%	6	0.09%		0.00%		0.00%	1	0.05%		0.00%	1	0.13%
Infectious Disease	2	0.01%	2	0.03%		0.00%		0.00%		0.00%		0.00%		0.00%
Metabolic and Endocrine	997	5.41%	607	8.65%	53	3.57%	8	0.78%	86	4.19%	22	2.38%	6	0.79%
Musculoskeletal System	63	0.34%	27	0.38%	7	0.47%	3	0.29%	2	0.10%	10	1.08%	1	0.13%
Neurology	32	0.17%	17	0.24%	7	0.47%		0.00%		0.00%	1	0.11%	3	0.39%
Obstetrics and Gynaecology	4	0.02%	3	0.04%		0.00%	1	0.10%		0.00%		0.00%		0.00%
Oncology	55	0.30%	28	0.40%	6	0.40%	2	0.19%	3	0.15%	4	0.43%		0.00%
Otorhino-laryngology	30	0.16%	16	0.23%	5	0.34%		0.00%	3	0.15%	2	0.22%		0.00%
Psychiatry	3	0.02%	2	0.03%		0.00%		0.00%		0.00%		0.00%		0.00%
Psychology	33	0.18%	26	0.37%	2	0.13%	1	0.10%		0.00%	1	0.11%	1	0.13%
Respiratory System	21	0.11%	12	0.17%		0.00%	1	0.10%		0.00%	2	0.22%	1	0.13%
Visual System	211	1.15%	69	0.98%	18	1.21%	5	0.48%	32	1.56%	22	2.38%	10	1.31%
Grand Total	18414	100.00%	7021	100.00%	1484	100.00%	1032	100.00%	2051	100.00%	923	100.00%	763	100.00%

Temporary Unfit (TU)

- 39 “long term unfit” assessments (UK, 1999)
  - 27 (69%) contacted CAA to advise of illness
  - 12 (31%) identified at periodic exam
    - 8 were identified on resting ECG
    - 4 (10%) were identified by physical examination

Age Profile Medical Certificates non-Irish



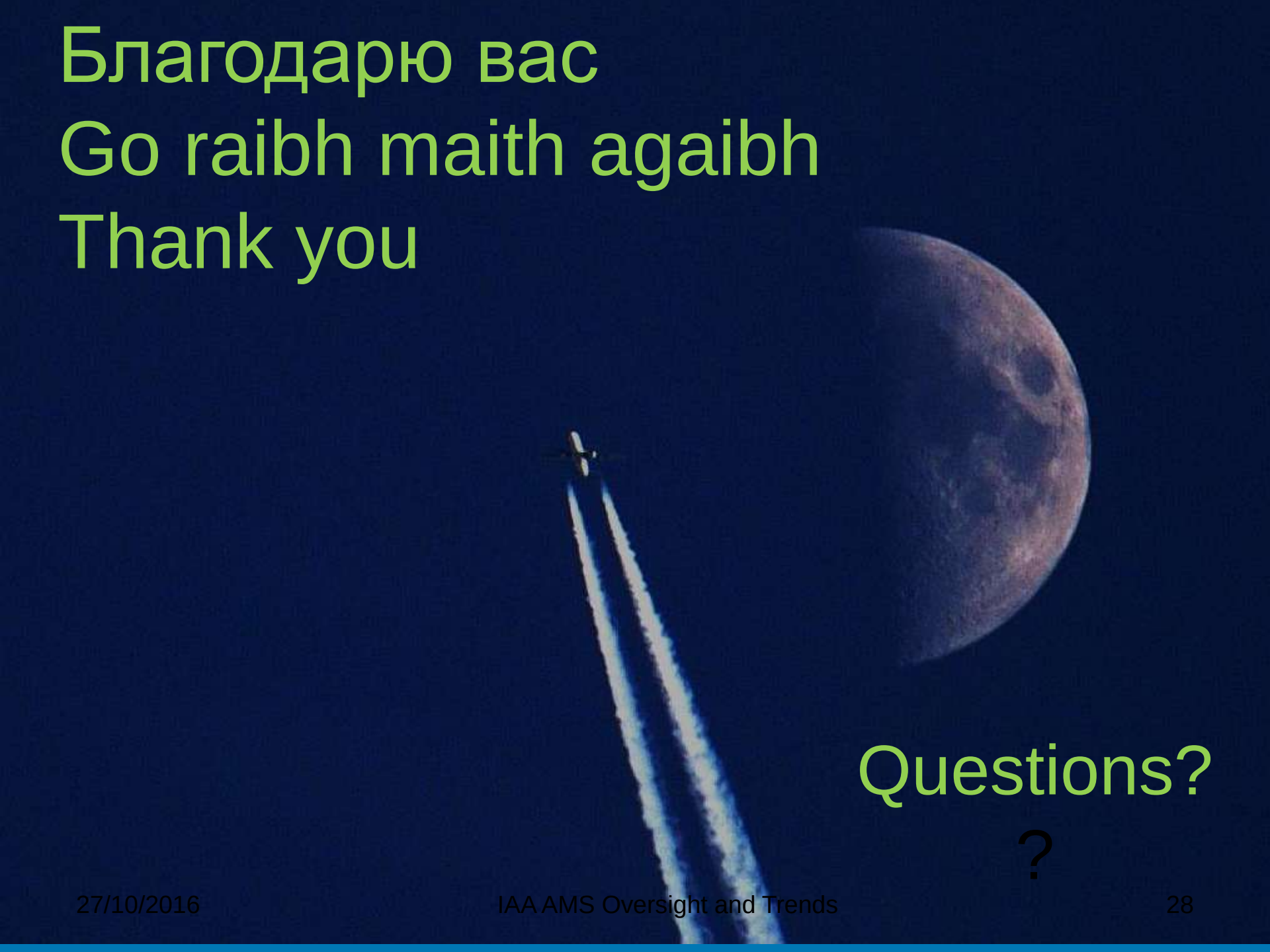
Reasons for TU Over/Under 40

Under 40 (n=78)	EASA REF	Over 40 (n=75)
3	?	2
7 (0.14%)	Cardiovacular System	9 (0.25%)
1	Respiratory System	1
5	Digestive System	7
2	Metabolic and Endocrine System	4
	Haematology	2
1	Genitourinary System	4
2	Infectious Disease	1
7	Obstetrics and Gynaecology	
21 (0.42%)	Musculoskeletal System	15 (042%)
2	Psychiatry	1
7 (0.14%)	Psychology	6 (0.16%)
4	Neurology	2
2	Visual System	3
	Colour Vision	
1	Otorhino-laryngology	1
1	Dermatology	
8 (0.16%)	Oncology	5 (0.14%)

Conclusions

- European cultural diversity presents a challenge to Standardisation
- Alternative Means of Compliance can improve the relevance of existing regulation
- Obesity and its effects are a significant cause for concern
- Continuing research will allow for relevant medical assessments in the future.
- Co-operative oversight will enhance the quality of data and rule making

Благодарю вас
Go raibh maith agaibh
Thank you



Questions?
?

Regular Medicals