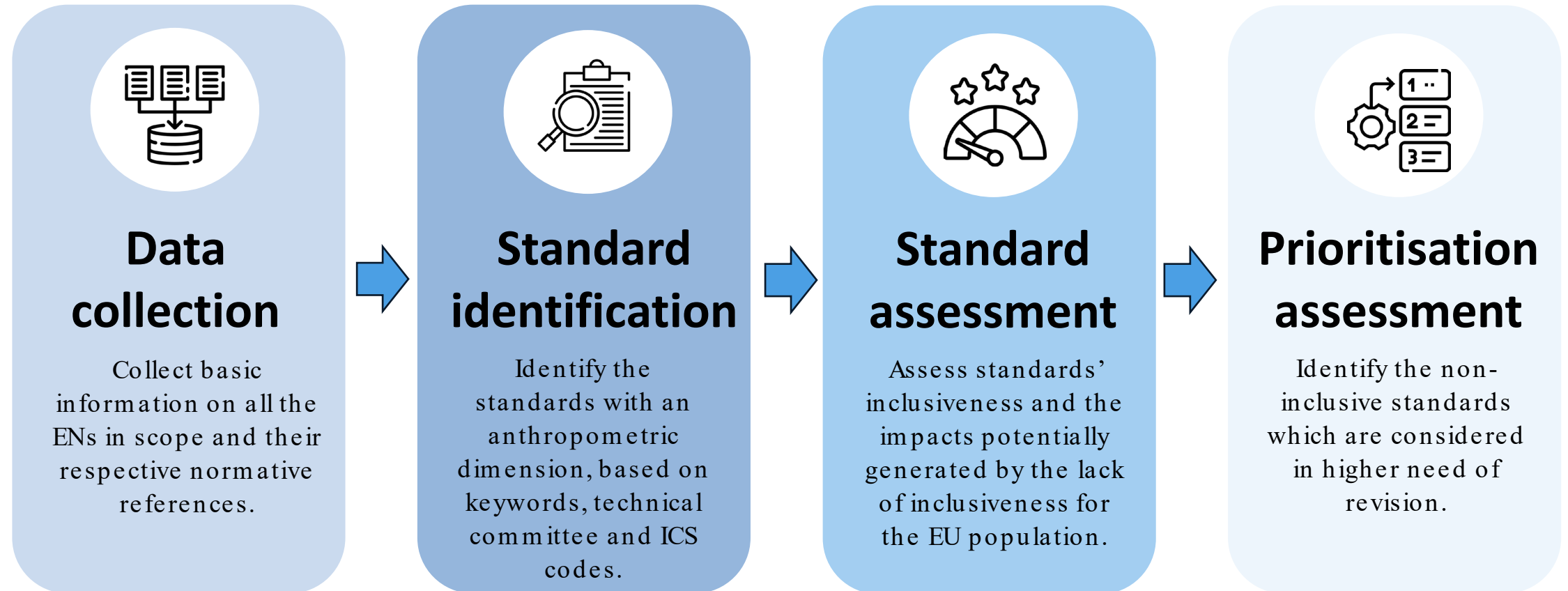


An aerial photograph of a city, likely Rome, showing a dense urban landscape with numerous buildings, red-tiled roofs, and a prominent church with a green dome. The image is partially obscured by a dark blue geometric overlay on the right side.

# STUDY ON THE INCLUSIVENESS OF ANTHROPOMETRICS IN EUROPEAN HARMONISED STANDARDS

# Methodological framework

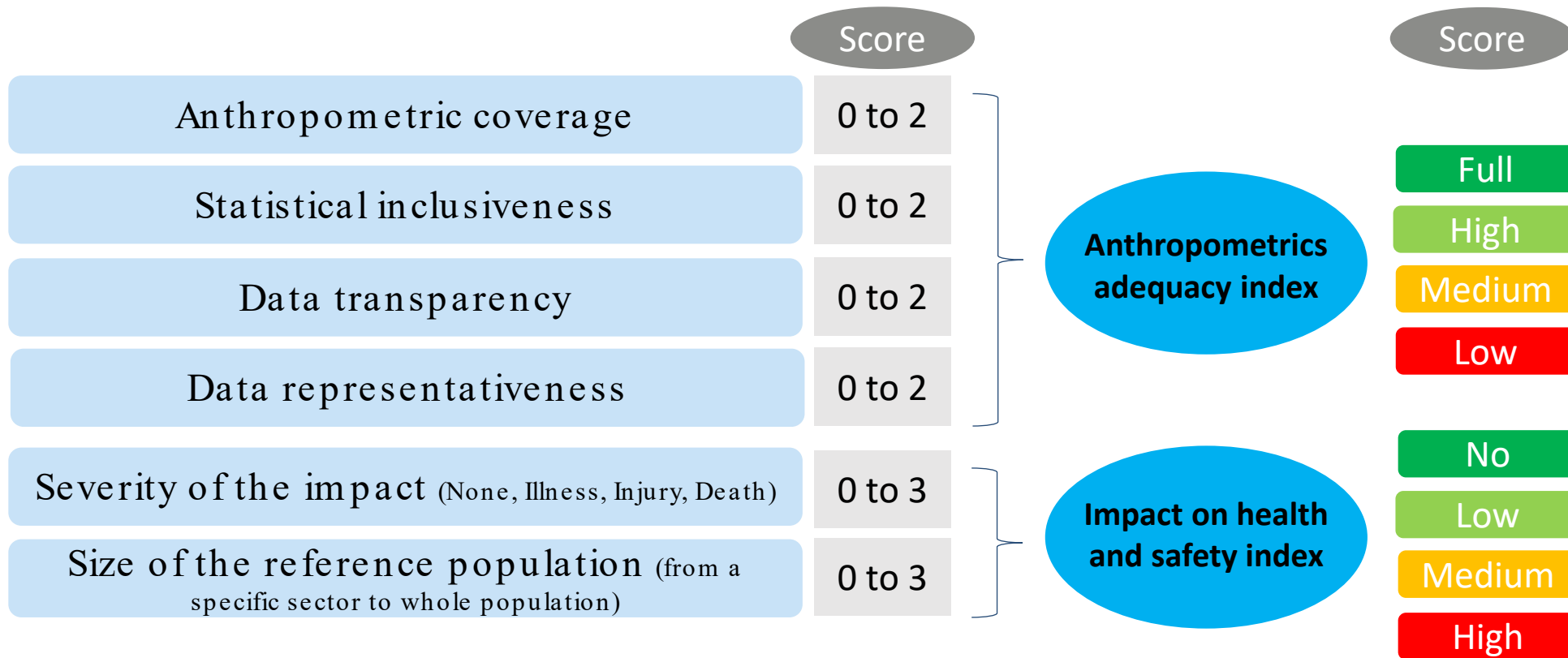


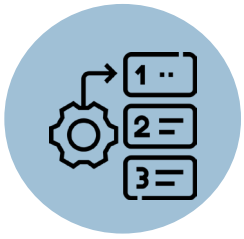


# Methodology for the assessment of anthropometric-related standards

The assessment is structured around **six main dimensions**, based on a close inspection of the standard document

Structured assessment grid with instructions for compilation





# Methodology for the prioritization of anthropometric-related standards

For each standard the adequacy and the impact indexes are combined to determine the priority of revision

		IMPACT INDEX			
		NO	LOW	MEDIUM	HIGH
ADEQUACY INDEX	FULL	Green	Green	Green	Green
	HIGH	Green	Light Green	Light Green	Light Green
	MEDIUM	Green	Light Green	Orange	Red
	LOW	Green	Orange	Orange	Red

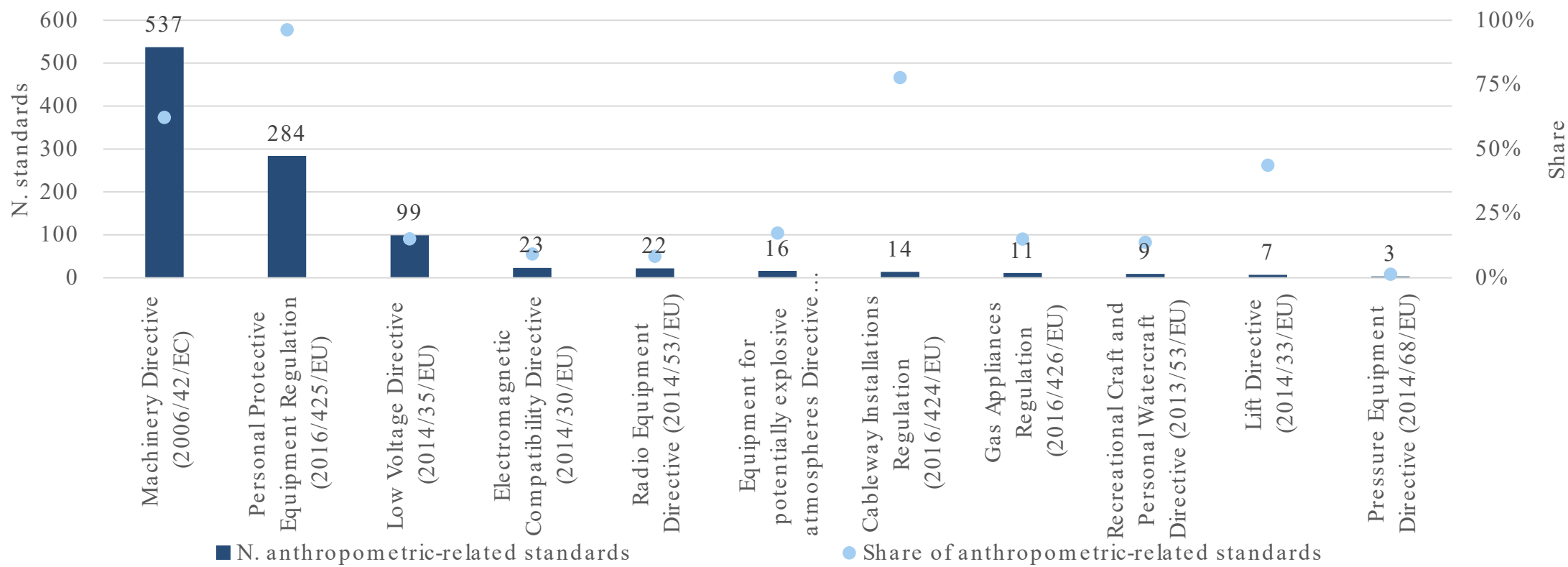
Legend:

No need for revision	Low priority	Medium priority	High priority
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# Anthropometric-related standards: statistics

- 964 (36%) standards are anthropometric-related



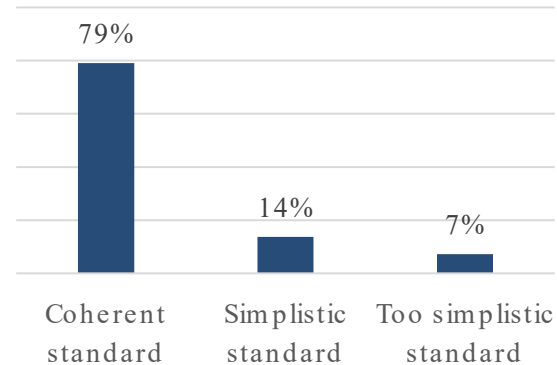


# Standards' adequacy sub-indices: statistics

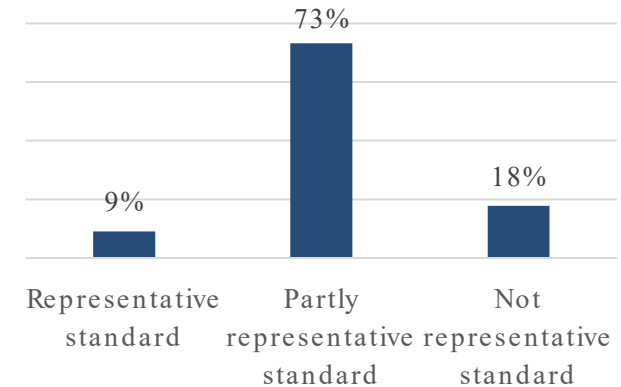
In-depth assessment of a representative **sample of 276** standards

- 79% of ENs assessed include reference to all relevant anthropometrics dimensions (coherent standard)
- 73% of ENs assessed either specify ranges and lower(upper) bounds or refer to other standards in their provisions
- 76% of ENs assessed do not account for the diversity of European bodies nor use disaggregated data

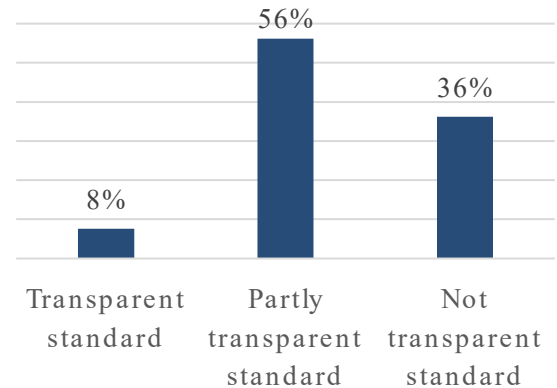
**Anthropometric coverage**



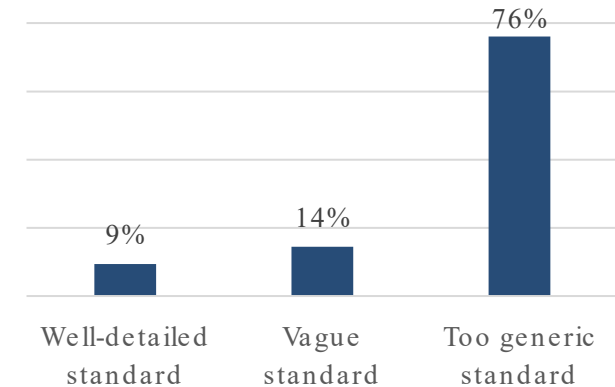
**Data inclusiveness**



**Transparency**



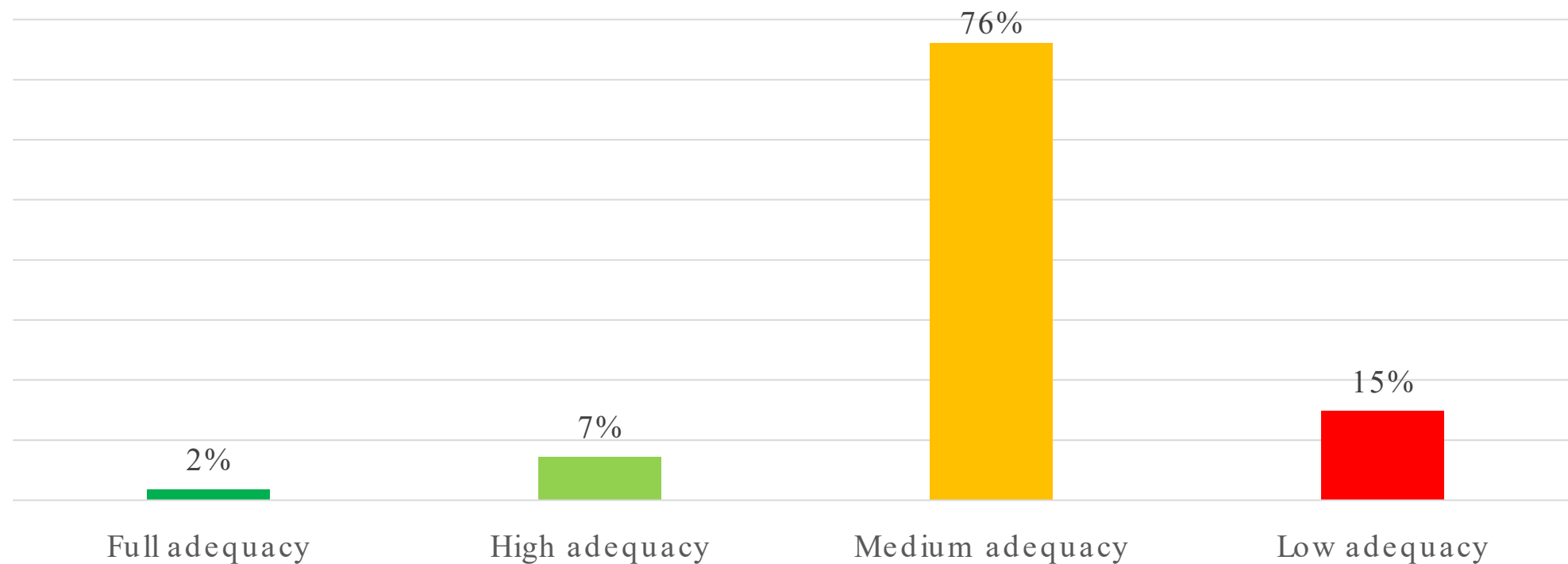
**Data representativeness**



n=276



# Standards' overall adequacy index



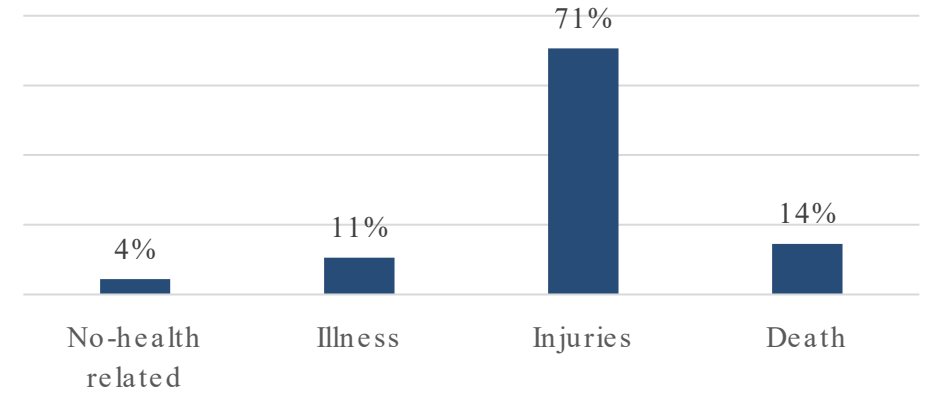
n=276



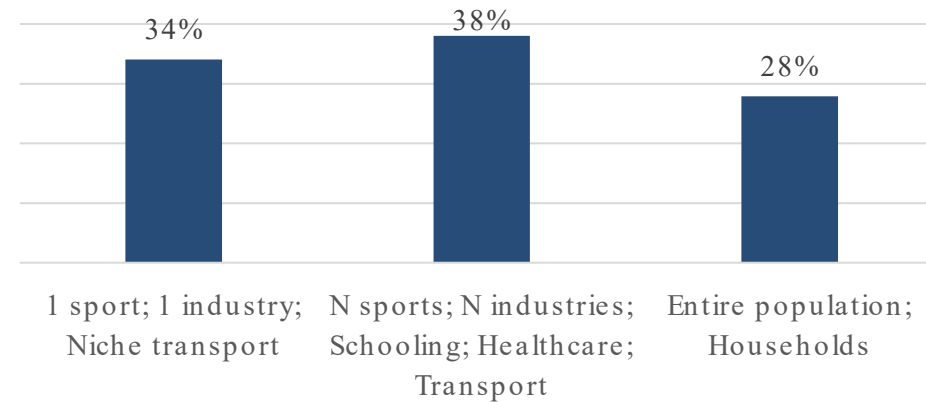
# Standards' impact sub-indices: statistics

- 71% of ENs assessed may potentially lead to injuries among the reference population if anthropometric considerations are not properly accounted for
- The typology of the reference population potentially affected by the non-inclusive standards is almost homogeneously distributed

Severity of the impact



Size of the reference population

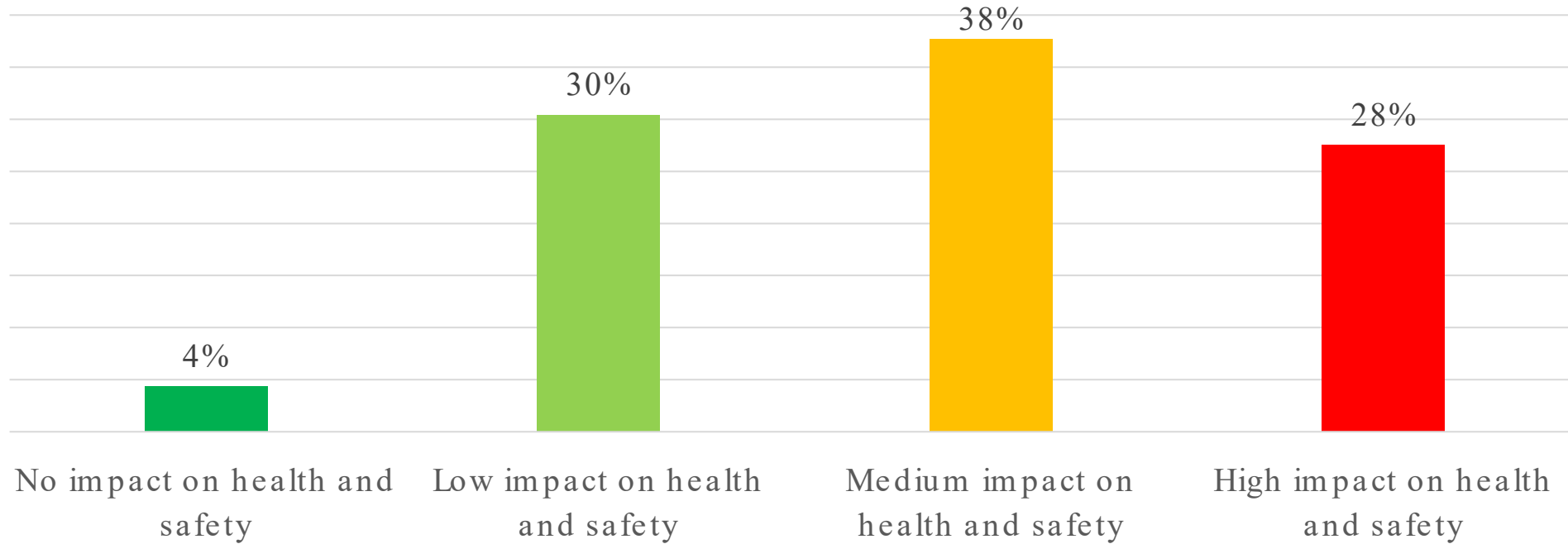


n=276

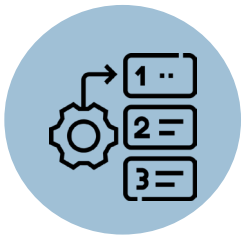




# Standards' overall impact index



n=276



# Standards' priority of revision

- The prioritisation exercise has revealed that:
  - 72 (26%) standards shall be revised with high priority
  - 106 (38%) standards shall be revised with medium priority
  - 81 (29%) standards shall be revised with low priority
  - 17 (6%) standards have no need of revision

		IMPACT INDEX			
		NO	LOW	MEDIUM	HIGH
ADEQUACY INDEX	FULL	0	1	3	1
	HIGH	6	4	7	3
	MEDIUM	6	67	76	61
	LOW	0	12	18	11

EUROPEAN STANDARD

**EN ISO 15536-1**

NORME EUROPÉENNE

EUROPÄISCHE NORM

September 2008

ICS 13.180

Supersedes EN ISO 15536-1:2005

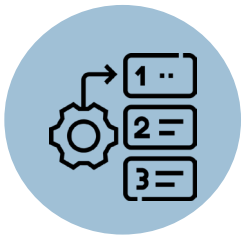
English Version

**Ergonomics - Computer manikins and body templates - Part 1:  
General requirements (ISO 15536-1:2005)**

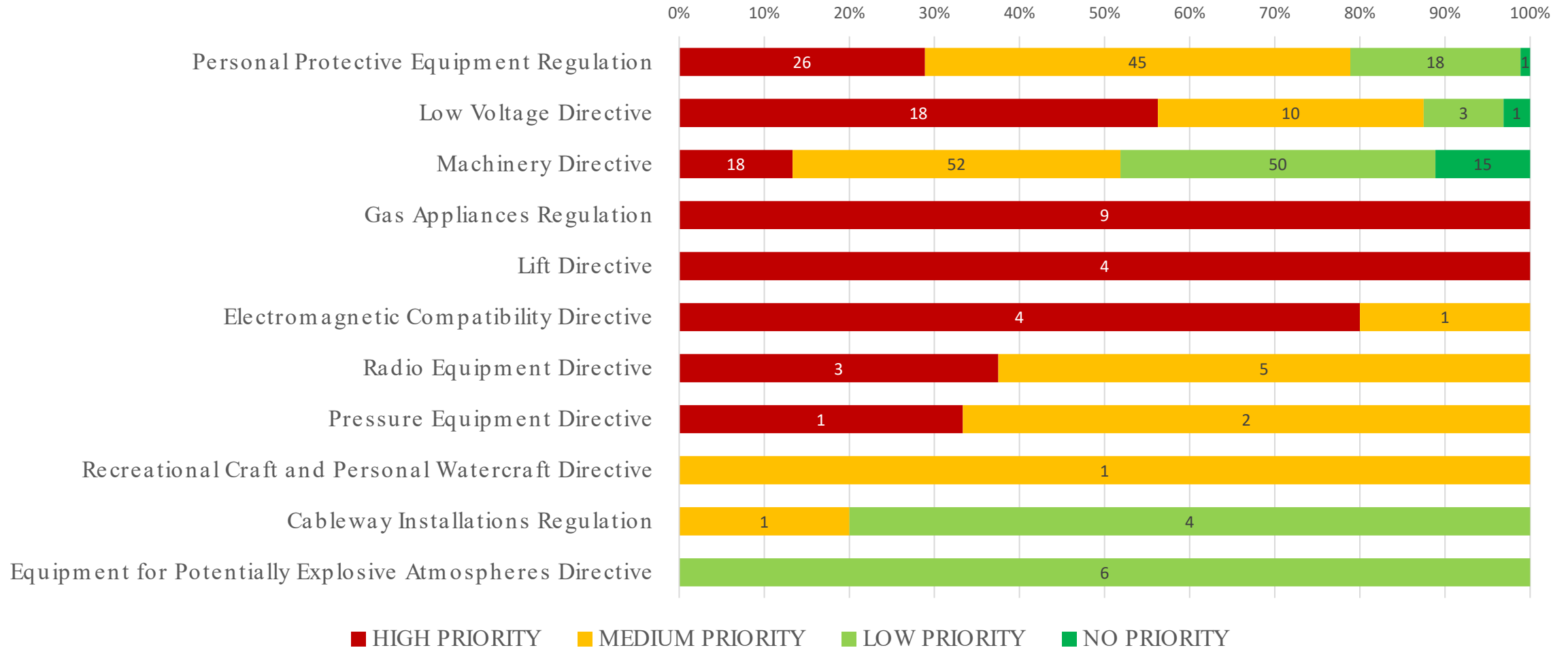
Ergonomie - Mannequins informatisés et gabarits humains  
- Partie 1: Exigences générales (ISO 15536-1:2005)

Ergonomie - Computer-Manikins und  
Körperumrisschablonen - Teil 1: Allgemeine  
Anforderungen (ISO 15536-1:2005)

This European Standard was approved by CEN on 25 August 2008.



# Standards' priority of revision by piece of legislation



# Key takeaways of the study



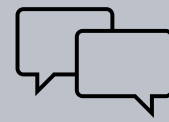
**Methodological framework**  
for standard assessment



**Toolkit to apply the**  
assessment methodology



**Results of the assessment** of  
all standards supporting  
directives / regulations of  
GROW H.2



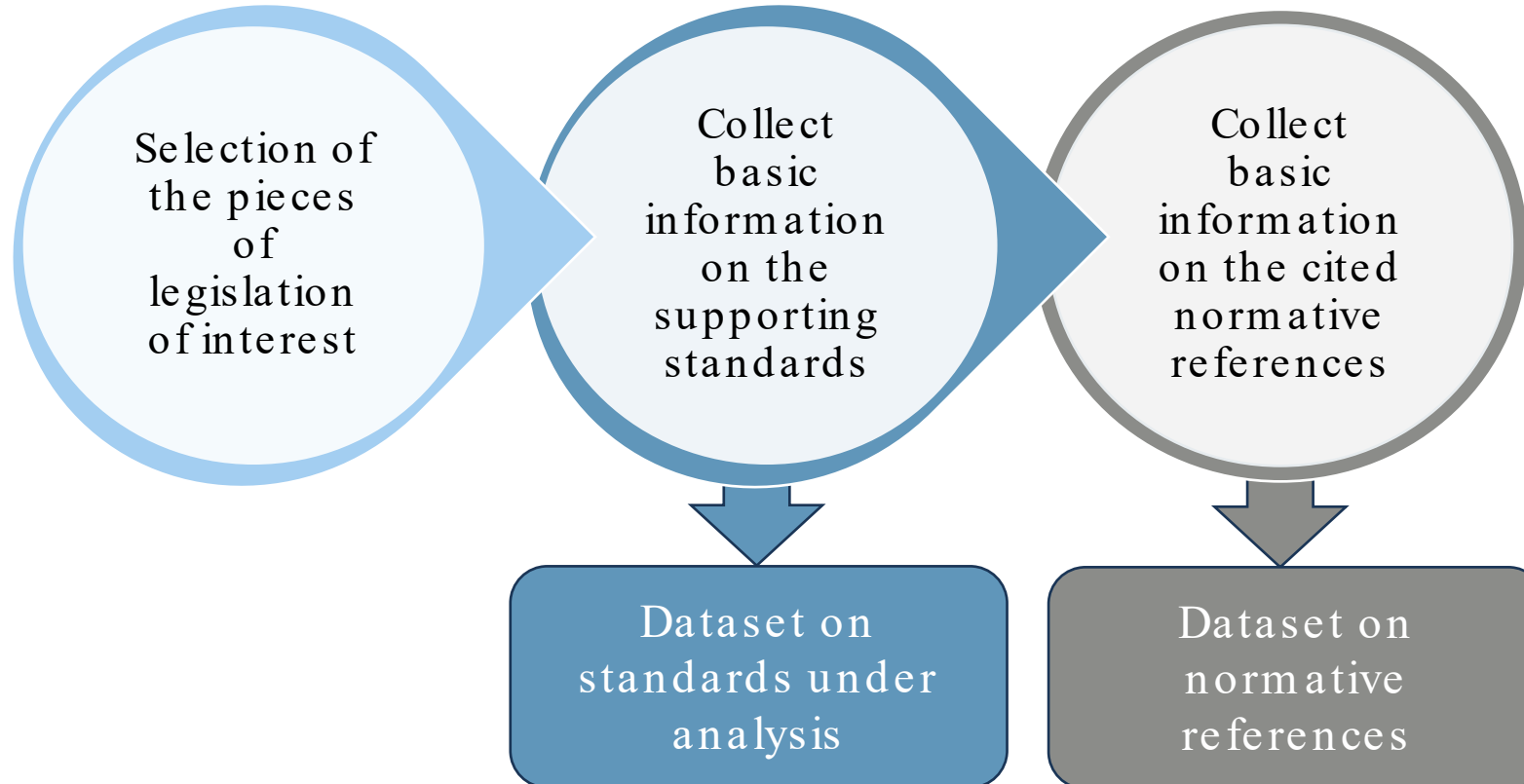
**Initial insights from**  
**discussion** with stakeholders

Emanuela Sirtori, [sirtori@csilmilano.com](mailto:sirtori@csilmilano.com)  
Alessandra Caputo, [caputo@csilmilano.com](mailto:caputo@csilmilano.com)

Thank you  
for your  
attention

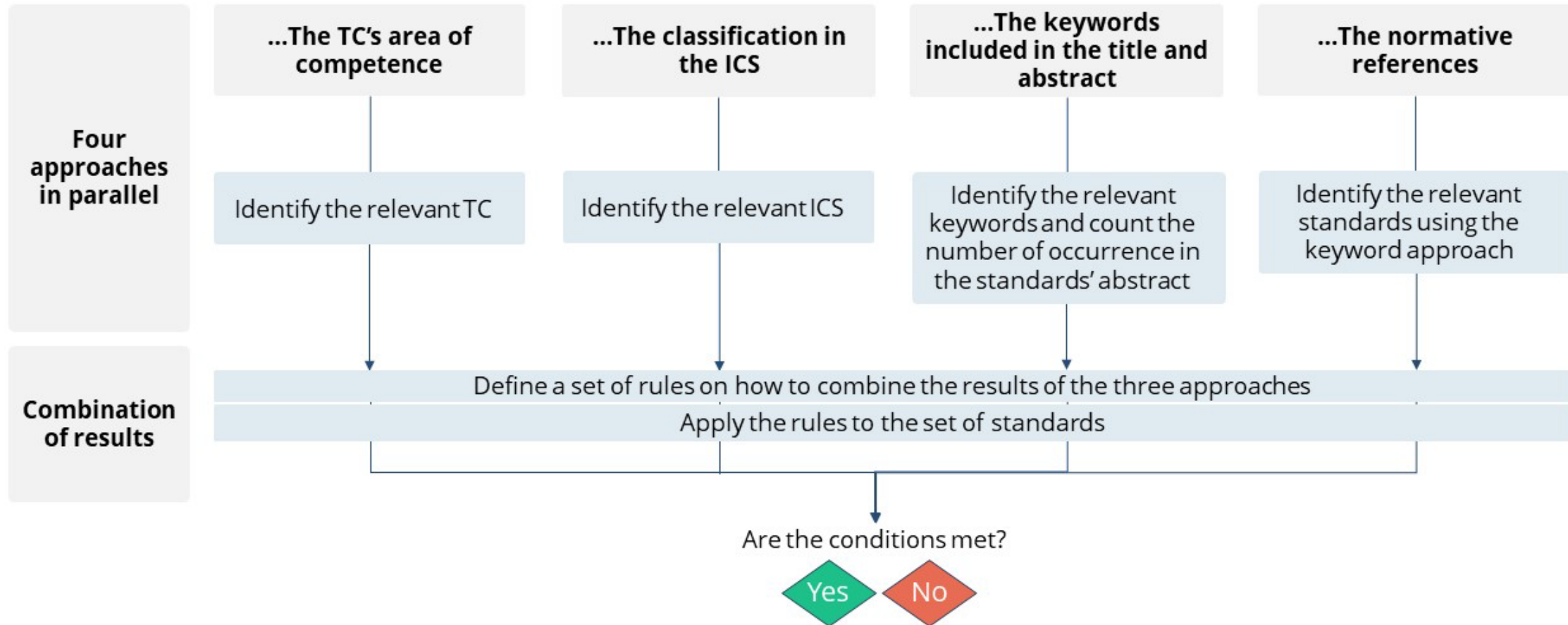


# Methodology for data collection





# Methodology for identification of anthropometric-related standards







# Pieces of legislation in scope

Mechanical engineering and means of transport	Consumers and workers protection
<ul style="list-style-type: none"> <li>• Machinery Directive (2006/42/EC)</li> <li>• Lift Directive (2014/33/EU)</li> <li>• Pressure Equipment Directive (2014/68/EU)</li> <li>• Simple Pressure Vessels Directive (2014/29/EU)</li> <li>• Aerosol Dispensers Directive (75/324/EEC)</li> <li>• Equipment for potentially explosive atmospheres Directive (2014/34/EU)</li> <li>• Cableway Installations Regulation (2016/424/EU)</li> <li>• Recreational Craft and Personal Watercraft Directive (2013/53/EU)</li> <li>• Gas Appliances Regulation (2016/426/EU)</li> </ul>	<ul style="list-style-type: none"> <li>• Personal Protective Equipment Regulation (2016/425/EU)</li> <li>• Noise Emission From Outdoor Equipment Directive (2000/14/EC)</li> </ul>
	Electric and electronic engineering
	<ul style="list-style-type: none"> <li>• Low Voltage Directive (2014/35/EU)</li> <li>• Electromagnetic Compatibility Directive (2014/30/EU)</li> <li>• Radio Equipment Directive (2014/53/EU)</li> </ul>
	Measuring technology
	<ul style="list-style-type: none"> <li>• Units of Measurement (80/181/EEC)</li> <li>• Bottles as Measuring Containers (75/107/EEC)</li> <li>• Metrology Framework (2009/34/EC)</li> <li>• Non-Automatic Weighting Instruments (2014/31/EU)</li> <li>• Measuring Instruments (2014/32/EU)</li> </ul>
Sustainability	
<ul style="list-style-type: none"> <li>• Pre-packaged products (76/211/EEC)</li> <li>• Pack sized (2007/45/EC)</li> </ul>	

# Insights from the workshops

EN 1005-2:2003  
Manual handling of machinery

**Very specific parameters not fully inclusive** - based on data for adult men collected in the US between the 1960s and 1980s

**Wide consensus** on the need to revise the standards to make it more inclusive

When anthropometrics are accounted for, there are **benefits for both employees/users**(safety, health, comfort) **and employers** (productivity, reduced illness cost)

EN ISO 15831:2004  
Measurement of thermal insulation with thermal manikin

**Very large ranges** in size and shape of thermal manikins in principle could ensure inclusiveness, but in practice only represent male human shapes

**No consensus** on the need to revise the standard, and limited awareness on the most relevant parameters of the human body to consider

**Cost challenges** but **future technological improvements** could make it less costly to make products adapted to the whole population (advanced simulation modelling)

Standards assessment methodology was validated

Need of more updated and representative anthropometric data

Trade-off between inclusiveness and costs – What is the optimal level of inclusiveness?

High value from collaboration between all the actors along the value chain: standardisers, testing labs, product manufacturers, workers, end-users.



# Dataset on standards analysed

- 2,650 ENs supporting the 15 pieces of legislation in scope
- Seven pieces of legislation are not supported by any standards

