

*EU JUST CT* 

*Results of the Literature review &  
survey of national competent  
authorities & radiology societies*

WP2 Lead: Shane Foley

<b>WP2: Collection of information about justification of CT examinations in Europe</b>	
Lead:	S. Foley
Co-Lead:	R. Bly
Contributors:	A. Brady, A. Karoussou-Schreiner, J. Sosna, Project Office Steering Group, Advisory Group
Duration:	M1-M7



## WP2: TASKS

- **2.1.** M1-M2: Perform literature review to identify major audits and surveys on justification of CT examinations carried out in the EU Member States, Norway, Switzerland and the UK in the past 10 years, and review and summarise their main findings
- **2.2.** M1-M7: Design, set-up, implement and evaluate a survey among the national competent and/or professional societies to identify audits and surveys on justification of CT examinations carried in the EU Member States, Norway, Switzerland and the UK in the past 10 years.



## 2.1 LITERATURE REVIEW

### Method:

- Databases: PubMed, Science Direct, Google Scholar
- Grey literature: websites & reports from Radiation Protection authorities
- Keywords: '*justification*', '*CT*', '*appropriateness*', '*imaging*'
- Publication limits: >2010, focus on European data
- Shared electronic database maintained

## 2.1 LITERATURE REVIEW RESULTS

Until Sept 2021: 27 relevant publications, (23 = European)

- Journal articles n=19
- National reports n=5
- Conference publications, n=3

Just 7 of European studies categorised as MAJOR audits organised nationally with data from multiple centres

Publications from 13 European countries

- US (n=2), Qatar (n=1), IAEA 18 country audit (n=1)



## 2.1 LITERATURE REVIEW RESULTS

**Table 1. Major audits of CT justification conducted at national level in Europe.**

Year of data collection	Country	Cohort	Number of centres	Sample Size	Justification rate*
2006	Sweden <sup>2</sup>	Adults & <u>Paeds</u>	93	2435	80% (51-98%)
2011	Sweden <sup>20</sup>	<u>Paeds</u>	72	653	86% (70-84%)
Not listed	United Kingdom <sup>23</sup>	GP referrals	88	1870	93%
2015	Belgium <sup>3</sup>	Adults	8	379	29-93%
2012-15	Norway <sup>15</sup>	Outpatients	29	668	87% (79-93%)
2015	Northern Ireland <sup>22</sup>	Adults & <u>Paeds</u>	25	450	94%
2016	Luxembourg <sup>14</sup>	Adults & <u>Paeds</u>	10	388	61% (28-81%)

\*justification rates parentheses indicate range of values for differing CT examinations

**Table 2. Single centre studies of CT justification in Europe**

Year of data collection	Country	Cohort	Sample Size	Justification rate
2005	Greece <sup>8</sup>	Not listed	410	33%
2005	Finland <sup>4</sup>	<35 years	200	23-77%
2008	Italy <sup>10</sup>	Outpatient	581	52%
2009	Finland <sup>5</sup>	Adults & Paeds (5-34 years)	177	73-100%
2010	UK <sup>21</sup>	Adult head	480	95%
2013	Romania <sup>18</sup>	Paediatrics	250	17-100%
2016	Italy <sup>12</sup>	Adult head (18-45yrs)	493	28-30%
2018	Portugal <sup>17</sup>	Emergency Department CT: Adults & Paeds	807	75%
Not listed	Greece <sup>7</sup>	Paeds	243	87%
2017	UK <sup>25</sup>	Adult CTPA	100	68%

**Table 3. Multi-centre studies of CT justification in Europe**

Year of data collection	Country	Cohort	No. centres	Sample Size	Justification rate
2012	Italy <sup>11</sup>	Adults	2	639	78%
2014	Spain <sup>19</sup>	Adults	2	519	73-78%
2015	Poland <sup>16</sup>	Not listed	2	799	93%
2012-17	Italy <sup>13</sup>	Adults	Not reported	29500	52-58%
2019	Ireland <sup>8</sup>	Adults	5	1158	89%

**Table 4. International studies of CT justification**

Year of data collection	Country	Cohort	No. centres	Sample Size	Justification rate
2007	USA <sup>27</sup>	Adult outpatient	1	284	38-88%
2009-17	USA <sup>26</sup>	Adults (18-40yrs)	324	203	62-98%
2015-17	IAEA <sup>29</sup>	Multiphase chest & abdomen/pelvis	18	2132	33%
2015-18	Qatar <sup>28</sup>	Adult women childbearing ages	2	451	81-95%

# ADDENDUM...SINCE

- Ståhlbrandt et al (2023): >10k CT referrals in Sweden assessed automatically via iGuide – 63% appropriate
- Westmark et al (2023): North Denmark – 100 CT referrals – 69% appropriate
- Appiah et al (2021): Belgium (3 centres) - -54-77% appropriate (depending on guideline used)
- De Rubeis et al (2021). Italy (1 centre) – Cardiac CTA, 58-66% appropriate



# RESULTS

- Justification rates: 28-100%
- Varied per CT exam (CT spine: 17-28%, multiphase CT: 33-53%)
- Audit methods varied
  - Sample sizes (100-29,500, median=450)
  - Mostly retrospective audits (n=21)
  - Auditors (1-18, mostly radiologists)
  - Reference standards (ACR, RP118, iRefer, NICE, national/local)

# DISCUSSION

- Very few CT justification audits to date
- Appropriateness rates well below 90%
- Need for common approach to audit methodologies



## 2.2 SURVEY METHODOLOGY

### **Design:**

- Input from all members, AG, SG & Commission
- Five sections: demographics, general justification, justification of new practices, CT justification, previous audits

### **Target audience: EU27+4**

- Presidents of National Radiological Societies (NRS) via ESR
- National Competent Authority (NCA) contacts via HERCA
- Regular reminders & three-week extension provided



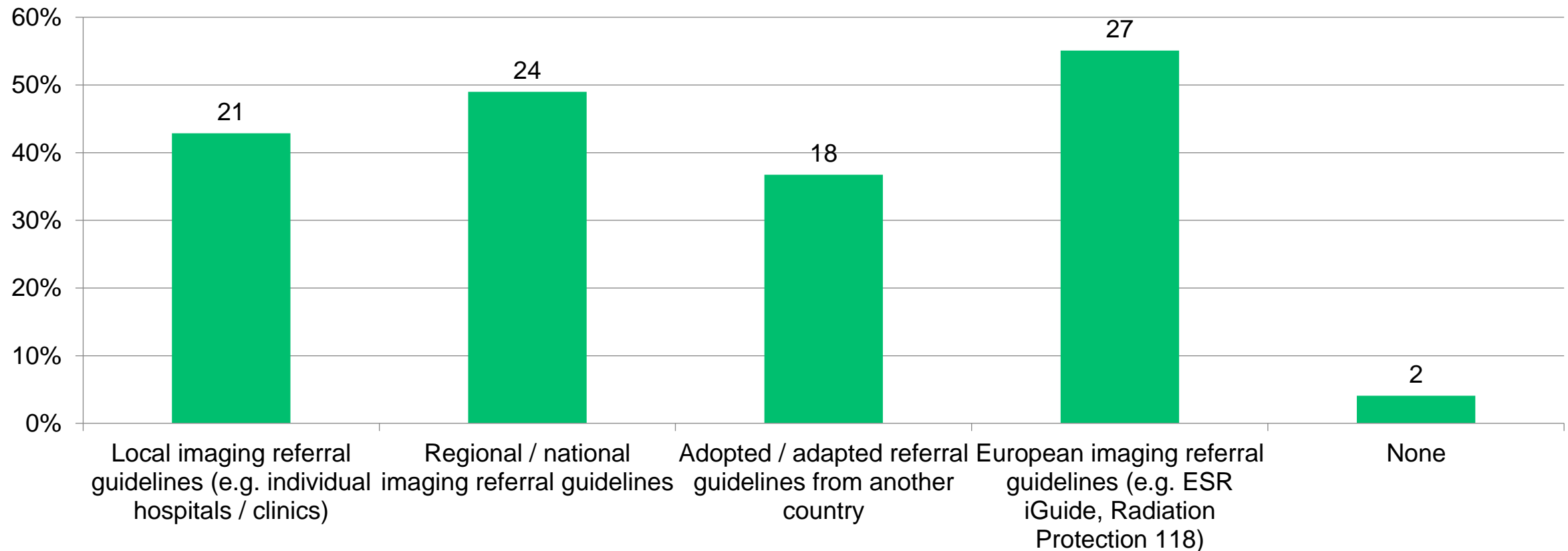
# RESPONSES

- n=56
- 2 incomplete, 3 duplicate = 51 for analysis.
- 30 countries:
  - 25 NRS, 21 NCA

Country	National Radiological Society	National Competent Authority
Austria	Austrian Radiological Society	-
Belgium	Belgian Society of Radiology	Federal Agency of Nuclear Control (FANC – AFCN)
Bulgaria	Bulgarian Association of Radiology	National Centre of Radiobiology and Radiation Protection
Croatia	Croatian Society of Radiology	-
Cyprus	-	Cyprus Regulatory Authority
Czech Rep	-	State Office for Nuclear Safety (SÚJB)
Denmark	Danish Society of Radiology	Danish Health Authority, Radiation Protection
Estonia	Estonian Society of Radiology	Environmental Board
Finland	Radiological Society of Finland	Radiation and Nuclear Safety Authority (STUK)
France	Société Française de Radiologie (SFR)	Autorité de Sûreté Nucléaire
Germany	Deutsche Röntgengesellschaft	Federal Office for Radiation Protection
Greece	Hellenic Radiological Society	Greek Atomic Energy Commission
Hungary	-	National Public Health Centre
Iceland	Radiological Society of Iceland	Geislavarnir ríkisins - Icelandic Radiation Safety Authority
Ireland	Faculty of Radiologists	Health Information and Quality Authority (HIQA)
Italy	Italian Society of Medical and Interventional Radiology (SIRM)	-
Latvia	Riga East University Hospital	-
Lithuania	Lithuanian Radiologists' Association	Radiation Protection Center
Luxembourg	-	Radiation Protection department, Ministry of Health
Malta	Maltese Association of Radiologists and Nuclear Medicine Physicians	-
Netherlands	Dutch Society of Radiology	-
Norway	Norwegian Society of Radiology	Norwegian Radiation and Nuclear Safety Authority
Poland	Polish Medical Society of Radiology	-
Portugal	Sociedade Portuguesa de Radiologia e Medicina Nuclear (SPRMN)	-
Romania	Romanian Society of Radiology	National Commission for Nuclear Activities Control
Slovakia	Slovak Radiological Society (SRS)	-
Slovenia	Slovenian Association of Radiology & University College Maribor	Slovenian Radiation Protection Administration
Spain	Spanish Society of Medical Radiology (SERAM)	-
Sweden:	Swedish Society of Radiology (SFMR)	Swedish Radiation Safety Authority
Switzerland	Swiss Radiological Society	Federal Office of Public Health
United Kingdom	The Royal College of Radiologists	Care Quality Commission (England)

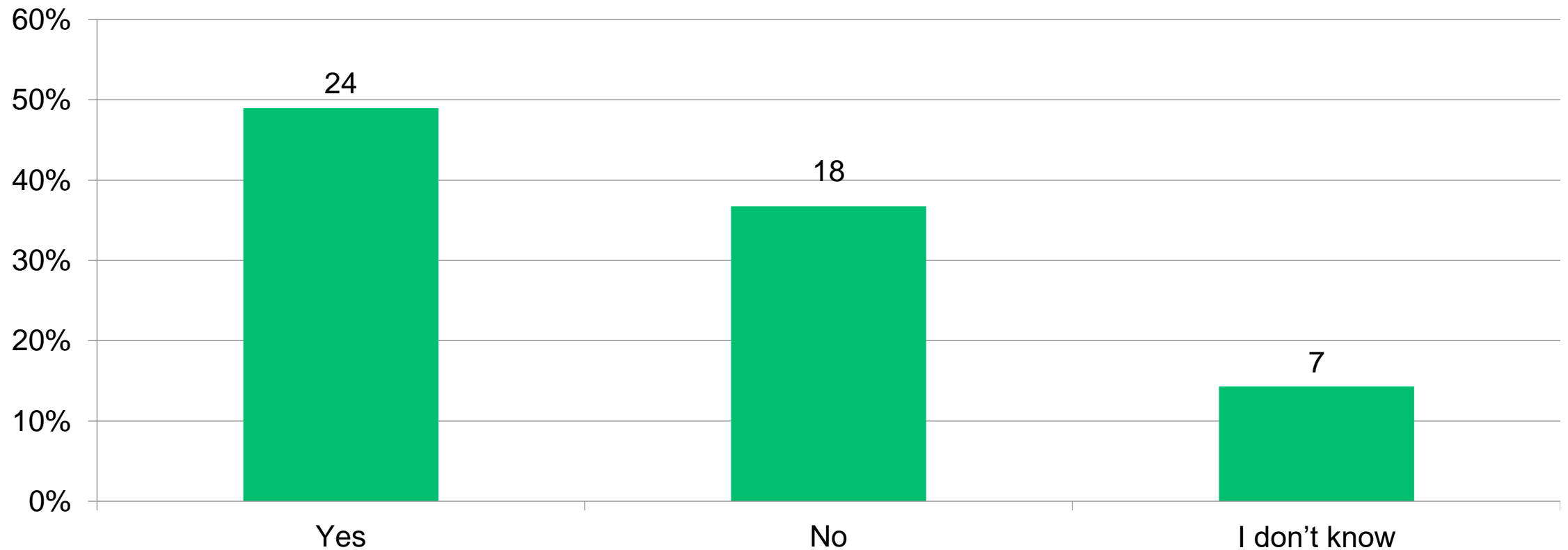
# REFERRAL GUIDELINES

**Which of the following imaging referral guidelines does your country recommend? (select all that apply)**



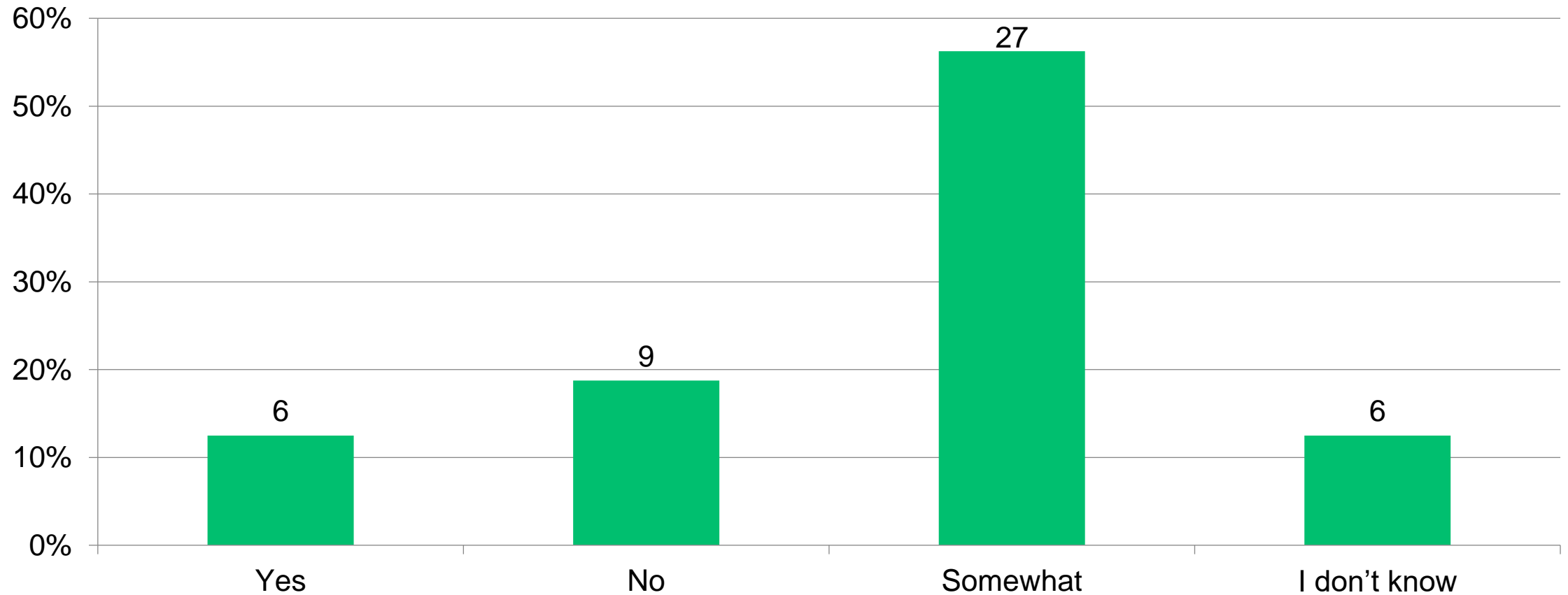
# REFERRAL GUIDELINES

**Are paediatric specific imaging referral guidelines available in your country?**



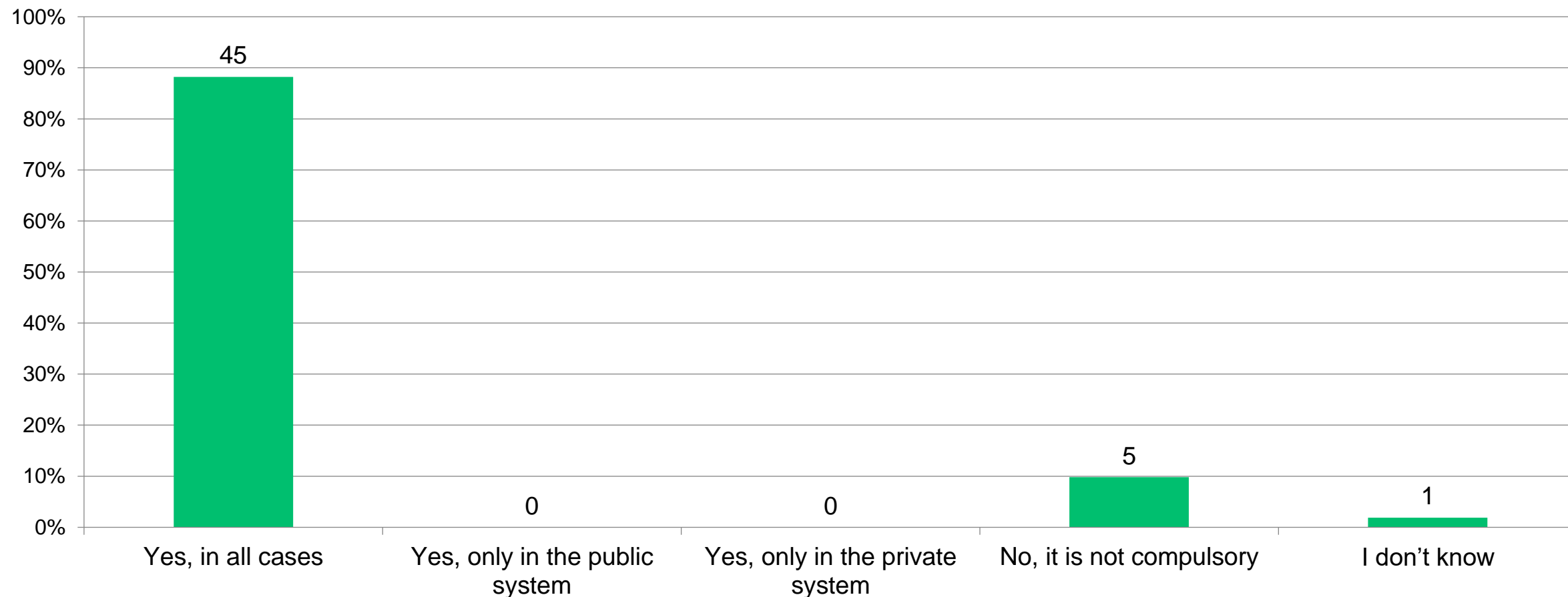
# REFERRAL GUIDELINES

To the best of your knowledge, are referral guidelines in daily use by referrers / radiology practitioners in your country?



# JUSTIFICATION OF C.T.

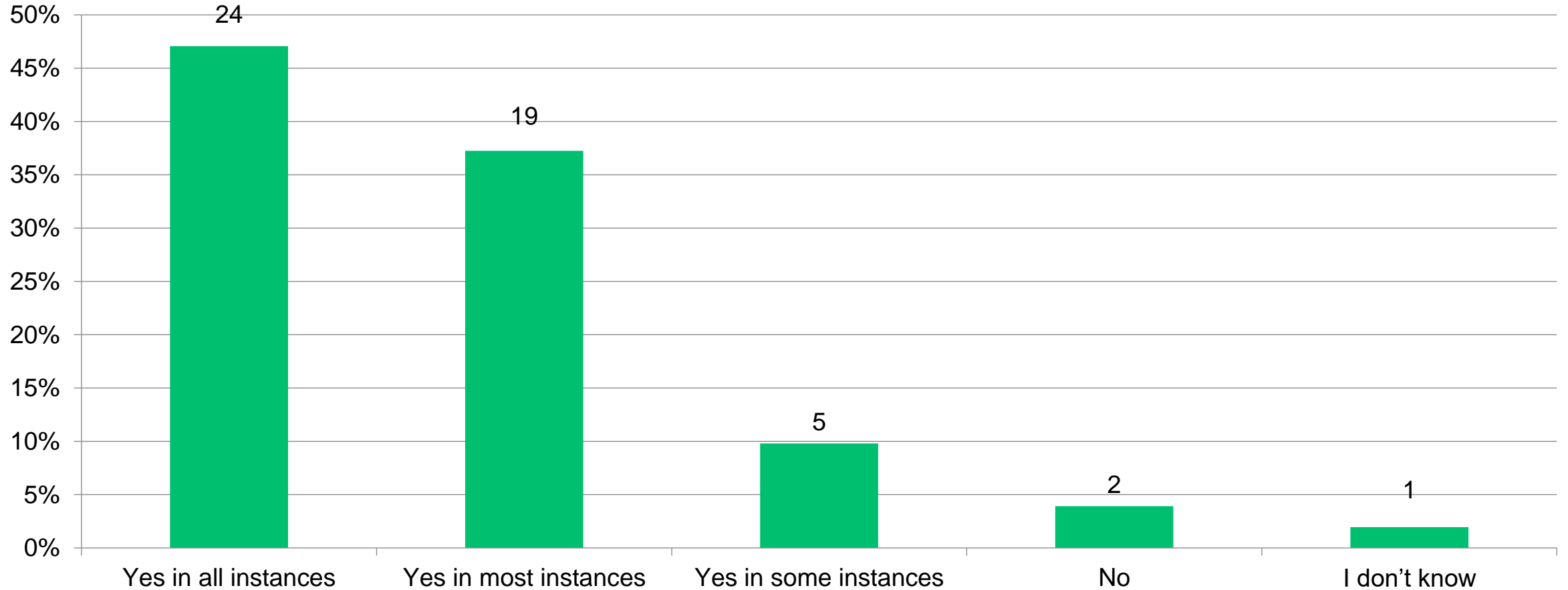
Is justification of individual CT examinations a legal requirement in your country?





# JUSTIFICATION

Are CT referrals justified by a medical practitioner before the examination takes place?

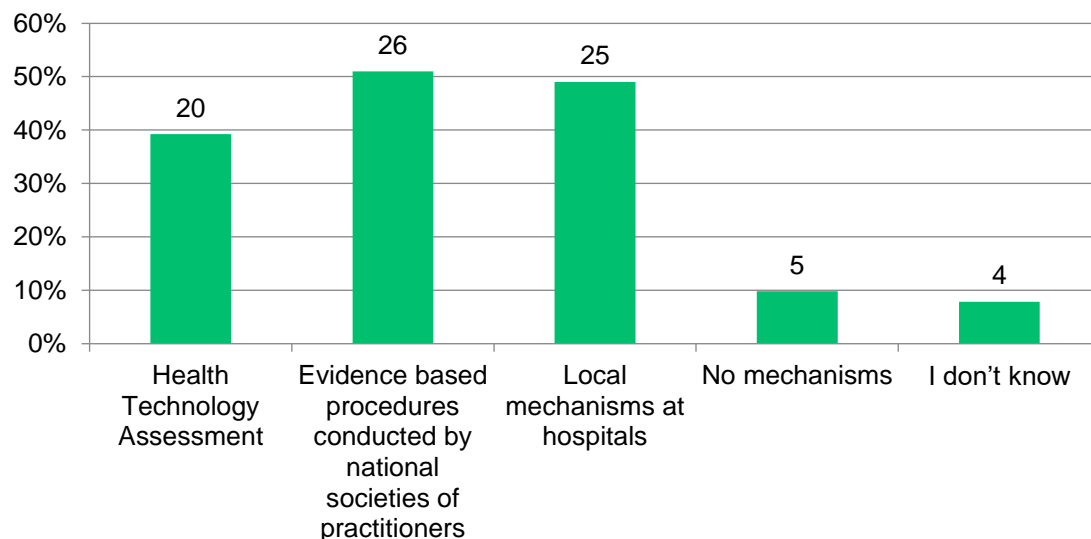


# JUSTIFICATION: NEW PRACTICES

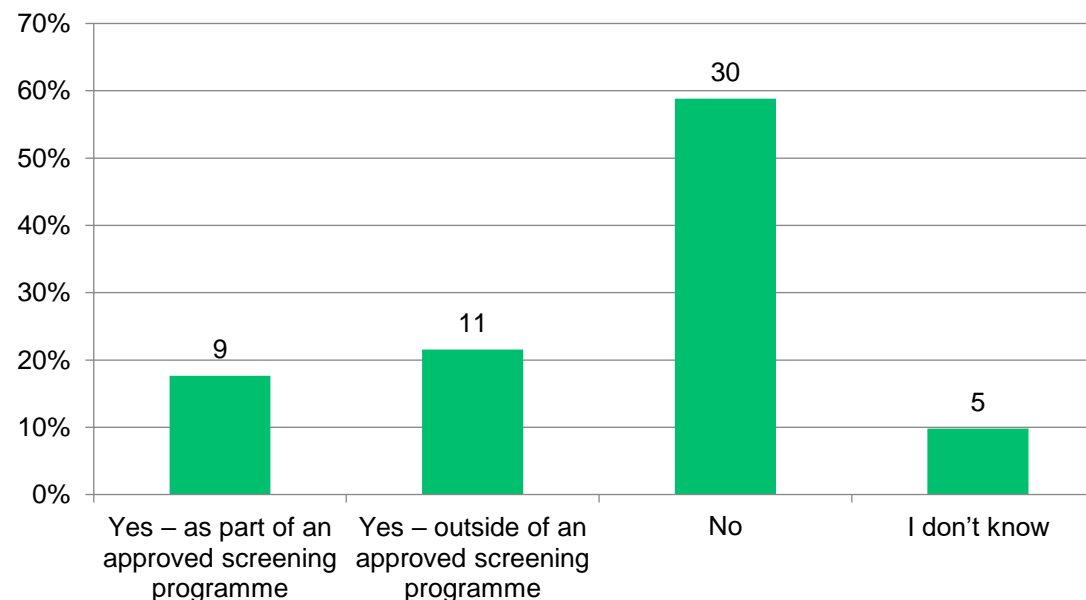
## National system in place for Level 2 justification?

- No: Belgium, Iceland, Portugal

What are the common mechanisms used for justification of new types of practice (with CT) (e.g. cardiac perfusion imaging)? (select all that apply)



Does health screening with CT take place in your country? (select all that apply)

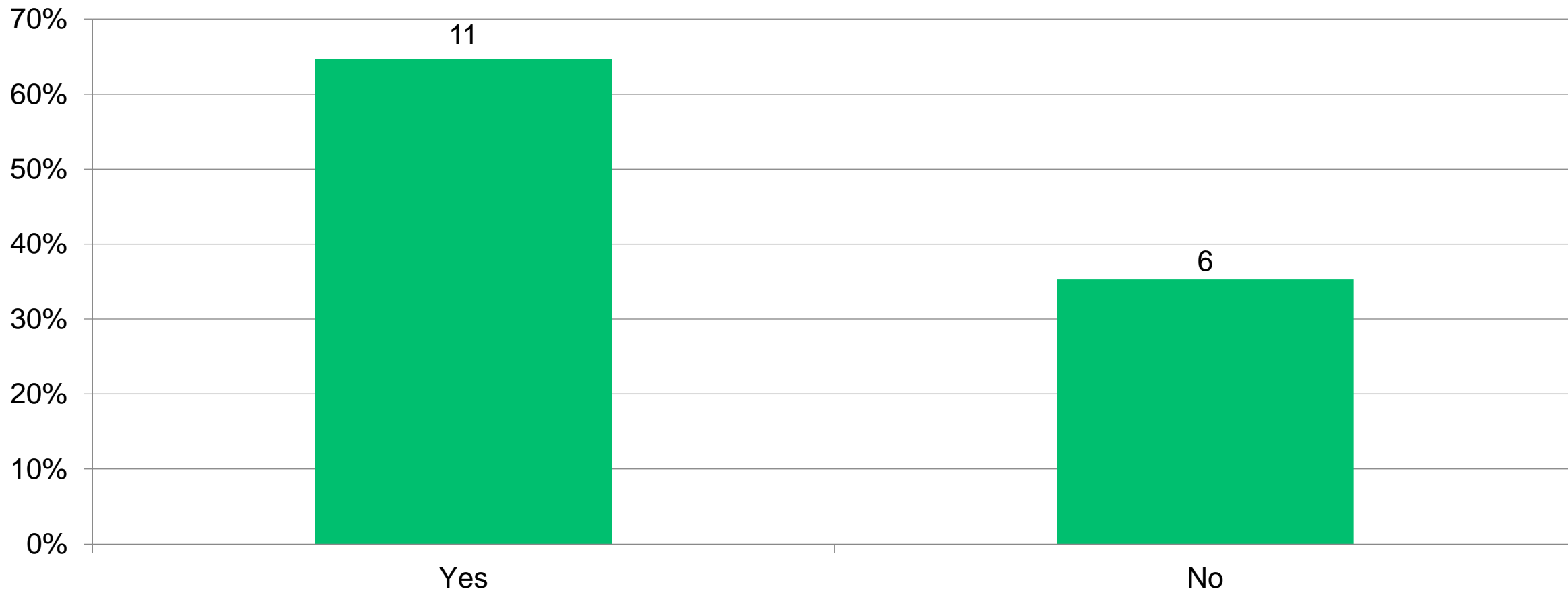


\*\* Differing responses NCA vs NRS

- Belgium, Bulgaria, Czech Republic, Finland, France, Greece, Norway

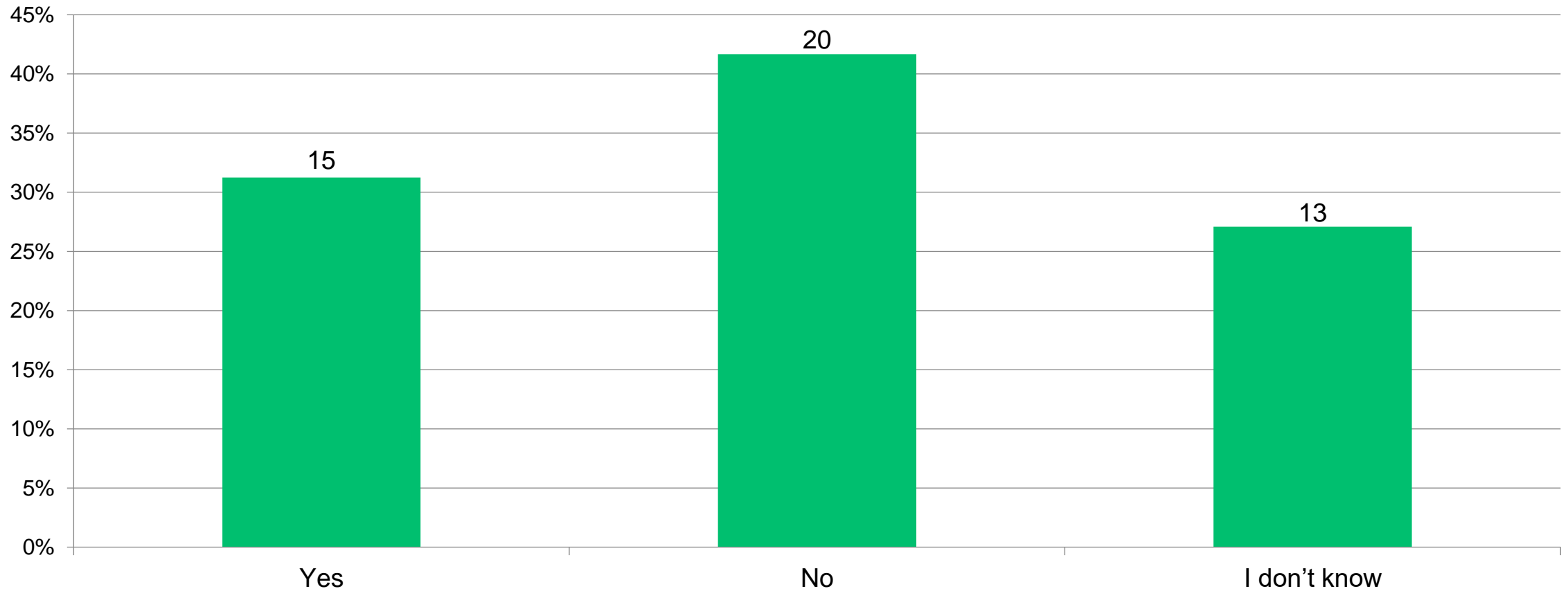
# JUSTIFICATION: NEW PRACTICES

If health screening with CT takes place in your country, is it regulated?



# PREVIOUS AUDITS

**Has there been any published audit / survey of the appropriateness of CT examinations carried out in your country in the past 10 years?**

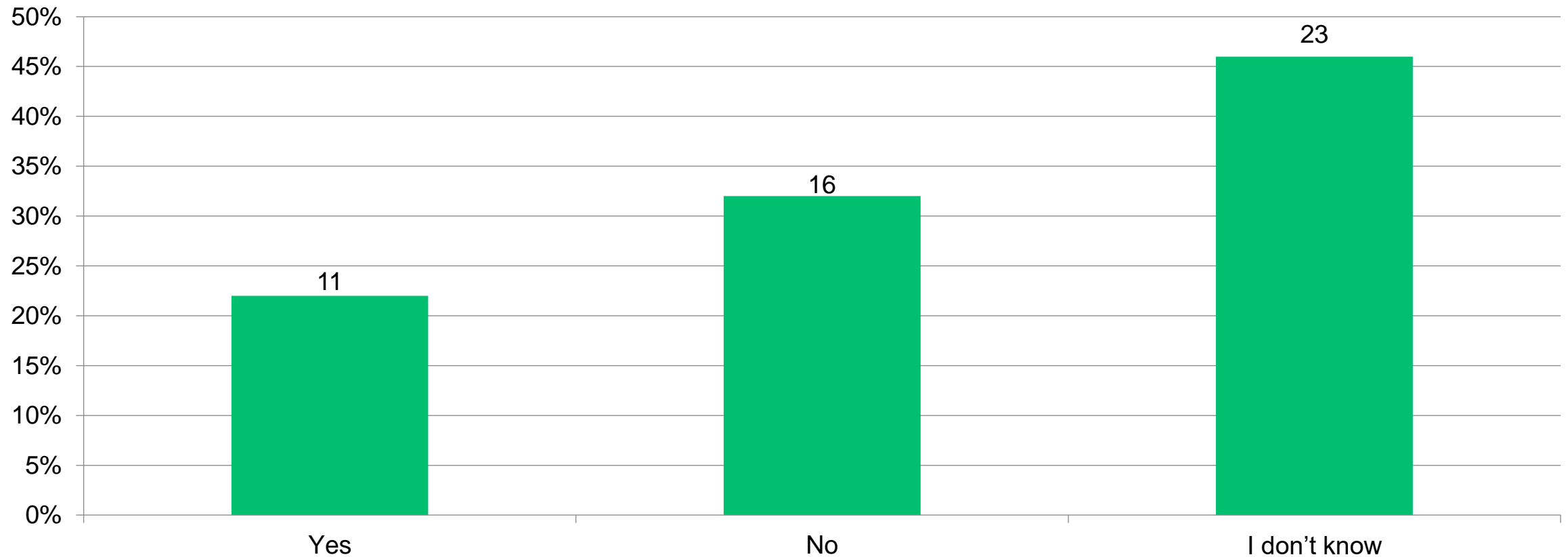


# KEY OUTCOMES

Country	Key outcomes / results from CT appropriateness audits
Estonia	Follow up audit showed significantly reduced CT numbers in the specific cohort (paediatrics)
Finland	The number of CT scans decreased significantly after the interventions and the level remained unchanged during the follow-up. Appropriateness improved significantly in CT scans already from 2005 to 2007
Luxembourg	CT appropriateness not satisfactory and collective efforts should be continued. The focus should be on general practitioners and on spinal CT examinations
Malta	Most audits showed poor adherence to guidelines in referral patterns
Norway	Large geographic variation in the use of CT and MR. Need for a clearer prioritizing of which CT and MR examinations to be performed. Many examinations are already performed (mainly other places) CT is used when MR is more appropriate (due to availability and waiting lists) 87,2% of examinations were agreed among reviewers to be justified, 2,5% agreed among reviewers to be not justified, 10,3% not agreed among reviewers to be justified. Total 1,1% of referrals were rejected.
Sweden	<ul style="list-style-type: none"> <li>• Written procedures for justification exist to a large extent and are known in the activities.</li> <li>• The remitters' responsibilities in the eligibility process are inadequately described.</li> <li>• Referrals for all more advanced examinations are prioritized and justified by radiologists.</li> <li>• The clinics state that they to a large extent reject referrals if it is not assessed be eligible for a radiological examination.</li> <li>• The clinics state that they change examinations to a large extent if they are inappropriate or incorrect modality is requested.</li> <li>• The clinics state that the radiologists often do not have the mandate to change the chosen modality without first talking to the remit.</li> <li>• The radiologists do not have direct contact routes with the remitters in primary care.</li> <li>• Decision support for remittances is available for standardized care processes, but not otherwise (except for one clinic).</li> <li>• CDS systems are not used in Sweden today.</li> <li>• Generally high quality of the referrals.</li> <li>• The proportion of rejected referrals differs greatly between the X-ray clinics (from 0% to just over 8%).</li> <li>• Formalized education in justification of medical exposures occurs in principle only in connection with Specialist Training programs for medical doctors and dentists.</li> </ul>

# FUTURE AUDITS

**Are there any audits / surveys of CT justification planned in your country in the next 24 months?**



# DISCUSSION POINTS


- Referral guidelines mostly available (except paediatrics!) but not necessarily in daily use & little if any integration into CDS
- CT not widely used for health screening
- Justification of new practices mostly regulated
- Lack of audit activity in CT justification
- Some inconsistency in responses – median 2 different responses (0-7).

ORIGINAL ARTICLE

Open Access

# Justification of CT practices across Europe: results of a survey of national competent authorities and radiology societies



Shane J. Foley<sup>1\*</sup> , Ritva Bly<sup>2</sup>, Adrian P. Brady<sup>3</sup>, Steve Ebdon-Jackson<sup>4</sup>, Alexandra Karoussou-Schreiner<sup>5</sup>, Monika Hierath<sup>6</sup>, Jacob Sosna<sup>7</sup>, ESR EU-JUST-CT Project consortium<sup>6</sup> and Boris Brkljačić<sup>8</sup>

## Abstract

**Objectives:** Published literature on justification of computed tomography (CT) examinations in Europe is sparse but demonstrates consistent sub-optimal application. As part of the EU initiated CT justification project, this work set out to capture CT justification practices across Europe.

**Methods:** An electronic questionnaire consisting of mostly closed multiple-choice questions was distributed to national competent authorities and to presidents of European radiology societies in EU member states as well as Iceland, Norway, Switzerland, and the UK ( $n = 31$ ).

**Results:** Fifty-one results were received from 30 European countries. Just 47% ( $n = 24$ ) stated that advance justification of individual CT examinations is performed by a medical practitioner. Radiologists alone mostly ( $n = 27$ , 53%) perform daily justification of CT referrals although this is a shared responsibility in many countries. Imaging referral guidelines are widely available although just 13% ( $n = 6$ ) consider them in daily use. Four countries (Cyprus, Ireland, Sweden, UK) reported having them embedded within clinical decision support systems. Justification of new practices with CT is mostly regulated (77%) although three countries (Belgium, Iceland and Portugal) reported not having any national system in place for generic justification. Health screening with CT was reported by seven countries as part of approved screening programmes and by eight countries outside. When performed, CT justification audits were reported to improve CT justification rates.

**Conclusions:** CT justification practices vary across Europe with less than 50% using advance justification and a minority having clinical decision support systems in place. CT for health screening purposes is not currently widely used in Europe.

## Key points

- CT justification practices vary across Europe.
- Less than half of respondents reported advance justification of CT examinations.
- Imaging referral guidelines are widely available but not in daily use.
- CT for health screening is not widely used in Europe at present.



QUESTIONS...?

*EU JUST CT* 

[shane.foley@ucd.ie](mailto:shane.foley@ucd.ie)

