

## DRAFT REPORT

### TASK 2: DATA NEEDED FOR DECISION MAKING

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EU FireStat - Closing data gaps and paving the way for pan-European Fire Safety Efforts

**Contractor:** European Commission  
Directorate General For Internal Market, Industry, Entrepreneurship  
and SMEs

**Reference of the contract:** SI2.830108  
Tender n°760/PP/GRO/PPA/19/11229 of 11/11/2019

**Date:** 28-06-2021

**Revision index:** A

**Number of pages:** 94

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## REVISION HISTORY

<b>Indices of revision</b>	<b>Date</b>	<b>Description</b>
A	28/06/2021	Initial version

## EXECUTIVE SUMMARY

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The nature and format of fire data collected varies significantly across the EU Member States. Naturally, this poses an obstacle to data comparison and thereby to effectively assessing potential best practices and successful safety approaches. The current project therefore addresses the need for common European terminology regarding fire statistics in buildings.

The pilot project consists of eight different tasks, this report covers Task 2. The goal of Task 2 is to propose which fire data will need to be collected in all EU Member States to provide such meaningful datasets for allowing legislative and other policy decisions on fire safety at the Member States and EU level. Such datasets would allow for knowledge-based decisions regarding fire safety at the Member States and at the EU level regarding building fires.

The proposal developed in this task is generally based on collating the opinions of stakeholders via a questionnaire. The main goal of the questionnaire was to ask the stakeholders of the Member States about their vision, opinion and experiences regarding the required data for forming and implementing fire safety policy. Running parallel (and interconnected) to the development of the questionnaire, the insights from the consortium were inventoried in a process of consortium opinion stocktaking.

The results of the survey among the stakeholders were compared with the data already collected by the EU Member States (extracted from Task 1), and with the opinion of the consortium partners. Findings from the literature were used to illustrate the importance of proposed variables. Priority was given to the variables that are already collected by the majority of the EU Member States and that are selected by the majority of the stakeholders and the consortium members.

We propose 13 variables to include in harmonized European fire statistics. As a starting point, the following eight variables should be collected.

### Tier 1:

1. Number of fatalities
2. Number of injuries
3. Age of victims
4. Fire cause
5. Type of building
6. Incident location
7. Incident date
8. Incident time

Once these eight variables have been implemented efficiently, we propose adding the second tier, which would include five additional variables:

### Tier 2:

9. Number of floors
10. Room of origin
11. Source of ignition (or heat source)
12. Material mainly responsible for fire development
13. Fire safety measures present

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## 1. INTRODUCTION

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The nature and format of fire data collected varies significantly across the EU Member States. Naturally, this poses an obstacle to data comparison and thereby to effectively assessing potential best practices and successful safety approaches. The current project therefore addresses the need for common European terminology regarding fire statistics in buildings.

### 1.1. SCOPE AND GOAL TASK 2

The goal of Task 2 is to propose which fire data will need to be collected in all EU Member States to provide such meaningful datasets for allowing legislative and other policy decisions on fire safety at the Member States and EU level. Such datasets would allow for knowledge-based decisions regarding fire safety at the Member States and at the EU level regarding building fires. A questionnaire was developed and distributed in this task to gather the opinions of stakeholders of the Member States regarding the required data for forming and implementing fire safety policy. Priority is given to the variables that were already collected by the majority of the EU Member States and that are selected by the majority of the stakeholders and the consortium members.

### 1.2. HOW TO READ

Section 2 contains a description of the development of the questionnaire, followed by a discussion of the distribution of the questionnaire in Section 3. Consequently, an overview of the respondents is shown in Section 4. In Section 5 the method for survey data analysis and the proposal is described. A detailed analysis of the survey results is given in Section 6, in Section 7 the results are analysed. Section 8 presents an overview of the results and discusses the strengths and limitations of the research. Finally, the proposal regarding which fire data would need to be collected in all EU Member States is laid out in Section 9.

### 1.3. LIST OF ABBREVIATIONS

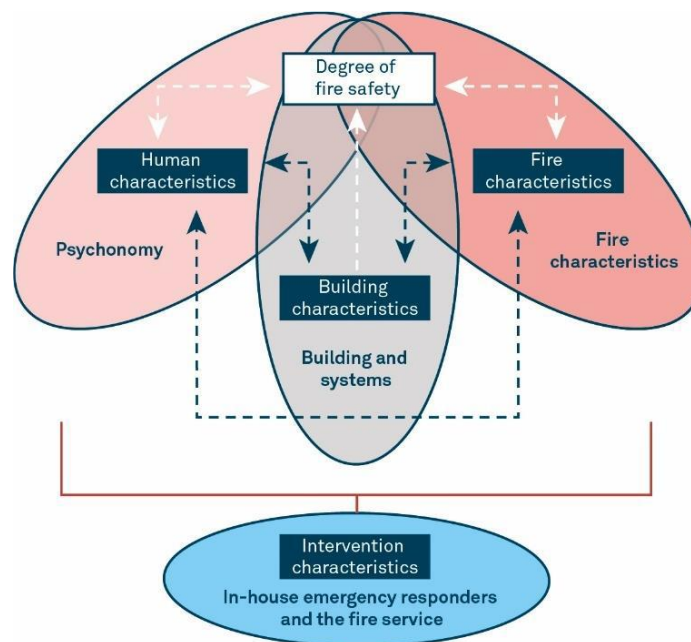
BAM	Bundesanstalt für Materialforschung und -prüfung
CFS-CTIF	Centre for Fire Statistics of CTIF
DBI	Danish Institute of Fire and Security Technology
EC	European Commission
EU	European Union
EuroFSA	European Fire Safety Alliance
LU	Lund University
MS	Member State
NFPA	National Fire Protection Association
PT	Project Team
UoE	The University of Edinburgh
VFDB	Vereinigung zur Förderung des Deutschen Brandschutzes

## 2. DEVELOPMENT OF A QUESTIONNAIRE

The main goal of the questionnaire was to ask the stakeholders of the Member States and some other non-EU countries about their vision, opinion and experiences regarding the data required for forming and implementing fire safety policy. Running parallel (and interconnected) to the development of the questionnaire, the insights from the consortium were inventoried in a process of consortium opinion stocktaking. In this way, optimal use can be made of the knowledge and experience of the partners of the consortium. These insights provided important input for the proposal.

There have been several meetings for developing a questionnaire and for stocktaking the opinion of the consortium. During various meetings in the fall of 2020, the model of influencing factors (characteristics scheme, see figure 2.1) and various principles for data collection were discussed.

The model of influencing factors and the principles not only form the basis of the proposal, but have also been applied in the development of the questionnaire. This model (see figure 2.1), based on scientific research, describes four factors that influence fire safety (Kobes, Helsloot, De Vries & Post, 2010). These factors are human characteristics, building characteristics, fire characteristics and intervention characteristics. Working with this model makes it easier to identify the variables that may have influence on the fire safety. This ensures that an overall picture is generated of all the variables to be collected.



**Figure 2.1 Model of influencing factors regarding the degree of fire safety (characteristics scheme)**

Most of the questions are related to the data variables that are considered necessary for providing meaningful datasets for decision-making. Several variables were suggested, clustered per type of characteristics (human, fire, building or intervention characteristics, to which the category 'consequences' was added). The suggested variables in the questionnaire are mostly taken from the results of task 1 on the field collected (the document *20201013 Summary Table final*). In other words, the lists within the questionnaire are based upon the terminology used in task 1, combined with the model described in the questionnaire. Along with the suggestions, explanations are given in order to secure the variables' validity as intended by our partners of task 1. The variable 'construction characteristics' was demonstrated by the additional text "e.g. façade, claddings". The main reason for using the same grid as task 1 when analysing was the contribution that it will make to the methodological coherence of the overall project. The respondents were able to allocate the variables to collect to the field they believe corresponds with their importance, those are labelled as 'must', 'should' and 'could' (question 4-8). The respondents also had the ability to add multiple variables that they believed were missing from the list of variables.

In addition to allocating the variables, the first question is about the types of building that should be in the scope of future harmonized statistics and/or which cases could be excluded. The purpose was to introduce a possibility for the stakeholders to consider possible limitations in the scope of the data collection (to limit the burden and increase comparability). A second question was added to gain insight into the purpose and goal of the collected fire statistics. In the third question, respondents were asked whether or not fire statistics were already used for policy decisions in their country and their view on the objective of fire statistics that are required to assess the context, practices and needs. The ninth question is about the fields of interest that should be covered by data collection. This is important information, since it provides us with an indication of what type of variables should be collected. E.g. if respondents state that consumer product safety should be covered within harmonized European fire statistics, variables that describe this field of interest should be collected.

The questionnaire was set online using Qualtrics. The questionnaire is presented in Annex I.



### **3. DISTRIBUTION OF THE QUESTIONNAIRE**

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A mailing list for distributing the digital questionnaire was developed. The main focus was to reach regulators from all EU Member States. Furthermore, the questionnaire was also sent to regulators from other countries where it was possible (such as in England, Scotland, Switzerland and New Zealand).

The goal was to include a representation of stakeholders that are involved in policy and legislation. The contacts were divided into three categories, listed by order of priority:

1. Authorities (such as the Ministry of Interior),
2. National fire services,
3. Others (including national statistics institutes, insurance companies, research bodies and fire (prevention) and fire service associations).

The main goal was to find one organisation per country to fill in the questionnaire, preferably on behalf of the authorities and ideally complemented with responses from the other categories.

In addition to the consortium's collective network, the Federation of the European Union Fire Officer Associations (FEU) and the EC were asked to suggest contacts from certain EU-countries that were not covered. After approval of the questionnaire by the EC on 1<sup>st</sup> of December 2020, the questionnaire was distributed by e-mail to all the identified contacts, followed with friendly reminders until the end of January 2021.

#### 4. OVERVIEW OF QUESTIONNAIRE RESPONDENTS

A total of 65 respondents from 31 different countries completed the questionnaire. All 27 EU Member States responded, as well as representatives from Scotland, Switzerland, the United Kingdom and New Zealand. Table 4.1 shows an overview of the respondents.

**Table 4.1 Overview of the total number of respondents**

Countries	Frequency			
	Authorities	National fire services	Other	Total
	<b>16</b>	<b>21</b>	<b>24</b>	<b>61</b>
Austria	0	0	2	2
Belgium	1	2	2	5
Bulgaria	1	0	1	2
Croatia	0	0	1	1
Cyprus	0	1	0	1
Czech Republic	1	1	0	2
Denmark	1	0	0	1
Estonia	0	1	0	1
Finland	1	0	1	2
France	2	0	1	3
Germany	0	2	4	6
Greece	0	0	1	1
Hungary	1	0	0	1
Ireland	1	0	0	1
Italy	0	5	0	2
Latvia	1	0	0	1
Lithuania	0	1	1	2
Luxembourg	1	1	0	2
Malta	1	0	0	1
Netherlands	0	0	2	2
Poland	1	0	1	2
Portugal	0	1	0	1
Romania	1	0	0	1
Slovakia	1	2	0	3
Slovenia	0	0	1	1
Spain	0	1	1	2
Sweden	1	3	5	9
Other European country: Scotland	0	1	0	1
Other European country: Switzerland	0	0	1	1
Other European country: England	1	0	0	1
Outside Europe: New Zealand	0	1	0	1

For the analysis some filters have been used. First of all, the non-European responses were excluded from the dataset.

Secondly, the responses have been aggregated to one answer per type of organization (1. authorities, 2. national fire services and 3. others) per country. In a number of cases, several respondents from the same organization (and the same country) completed the questionnaire, often giving the same answer. As a result, a skewed picture may arise for the average picture for all countries. Therefore, it was decided to aggregate the individual responses to one average response per country per type of organization. The individual responses are aggregated to the organizational level. When there is only one response from an organization within a country, the aggregated response is identical to the response on the individual level. When there are multiple responses from an organization within a country, the responses within this group are replaced by one aggregated response that summarises the individual responses. This aggregated response is composed by a majority vote principle. The criterion for selecting a variable during the aggregation is obtaining the majority (fifty percent or more) within an organization. This has resulted in the 16 responses from the authorities being merged into 15 responses, 21 responses from the national fire services into 12 responses, and 24 responses from other types of organisations into 14 responses.

Lastly, to give an overview per country, we aggregated the responses to one response per country. For example, the nine responses from Sweden were combined to one average response. The same procedure was followed as for the aggregation per type of organization. As a result, all 65 responses were merged into 27 responses, i.e. into one response per country.

After the aggregation process, the responses per organization type and the total of stakeholders is shown in the table 4.2 (on next page).

**Table 4.2 Overview of the responses after aggregation**

Countries	Aggregated frequencies			
	Authorities	Fire brigade / Executive body	Other	Total
	15	12	14	27
Austria	0	0	1	1
Belgium	1	1	1	1
Bulgaria	1	0	1	1
Croatia	0	0	1	1
Cyprus	0	1	0	1
Czech Republic	1	1	0	1
Denmark	1	0	0	1
Estonia	0	1	0	1
Finland	1	0	1	1
France	1	0	1	1
Germany	0	1	1	1
Greece	0	0	1	1
Hungary	1	0	0	1
Ireland	1	0	0	1
Italy	0	1	0	1
Latvia	1	0	0	1
Lithuania	0	1	1	1
Luxembourg	1	1	0	1
Malta	1	0	0	1
Netherlands	0	0	1	1
Poland	1	0	1	1
Portugal	0	1	0	1
Romania	1	0	0	1
Slovakia	1	1	0	1
Slovenia	0	0	1	1
Spain	0	1	1	1
Sweden	1	1	1	1

## 5. METHOD FOR SURVEY DATA ANALYSIS AND THE PROPOSAL

For the purpose of a proposal, we first created five principles for data collection in general. These have also been used for the development of the questionnaire:

1. The first principle is to start the data collection in a compact and simple way.
2. The second principle is to focus on the fire data that is deemed essential at a European level.
3. The third principle is that small differences in definitions among countries are acceptable, as long as the differences have little influence on the outcome. Nevertheless, a disclaimer should be used in the dataset in order to be transparent about this principle.
4. The fourth principle is to focus on risk factors instead of common factors, and to pay attention to the difference between correlation and causality. Regarding the risk factors, insights in general aspects (for example data on the population and building stock) are needed as well.
5. The fifth principle is that there are different possible users of data (different target groups) with different needs.

The proposal developed in this task is generally based on the opinion gathered from the results of the questionnaire. Additionally, the results of the questionnaire from the stakeholders were combined with the data already collected by the EU Member States (extracted from Task 1), and with the opinion of the consortium partners. We only used the information about the EU-27 countries for the process of justification. Findings from the literature were used to illustrate the importance of proposed variables.

The final report of Task 1 has been used to illustrate the number of countries already collecting data. However, data is missing for 6 EU-countries (hence covering 77% of the EU). In some case where specific variables are not found in Task 1 report, those are extracted from the analysis made in Task 0 report, which is a rough approximation (see Annex III). However, Task 0 report is missing information from Belgium, Cyprus, Estonia, Finland, Lithuania, Malta, Portugal, Romania and Slovenia (hence covering only 66% of the EU).

A number of criteria were used within the process for the selection of the data needed for fire statistics:

1. We considered variables which have a majority of votes ( $\geq 50\%$ ) compiled from the category 'must be included in a dataset of fire statistics'.
2. We also considered variables that have at least more than 40 % approval by all the respondents. Using this limit value, including a margin of error of  $\pm 10$  points, allows for a larger coverage of opinions, such as a near majority. By doing this, more variables were considered in the justification process.
3. A variable already being collected by the majority of the 27 EU Member States is given more importance than a variable that is not yet being collected.

The proposal, as a result of the justification process, consist of a set of variables for harmonized data collection. For the proposal, a Venn diagram is used to prioritize and visualize the results.

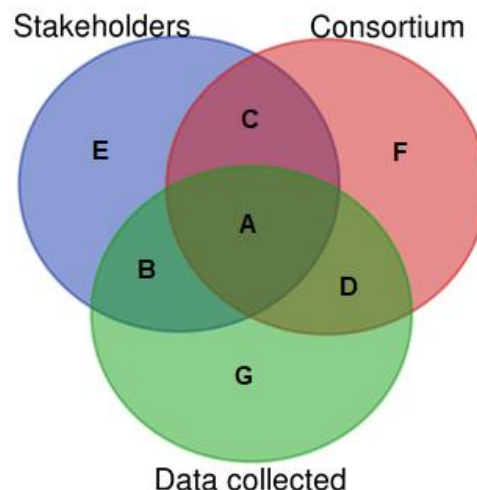


Figure 5.1 Example of the Venn diagram

Figure 5.1 shows the diagram that is used to prioritize the variables. The process is as follows:

1. Variables that were selected by the majority of the stakeholders and consortium, and already collected. These variables must be included in harmonized data collection (A).
2. In addition to those variables, the variables voted by the majority of the stakeholders and already collected are included in the proposal (B).
3. Variables selected by the majority of stakeholders and the consortium, but that are not collected by the majority of countries, are included (C).
4. Variables that are selected by the consortium and are collected by the majority of the countries are included (D).
5. The variables that are only mentioned by the stakeholders or the consortium or that are already collected by the 27 EU Member States but that are not considered important by a combination of the aforementioned (Stakeholders, consortium, or EU 27), are described<sup>1</sup> (E, F, G).

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<sup>1</sup> Variables that are included are selected / collected by at least 40 % (the same lower limit that applies to the justification process, described above). Variables with a higher percentage, take precedence over those with a lower percentage.

## 6. SURVEY RESULTS

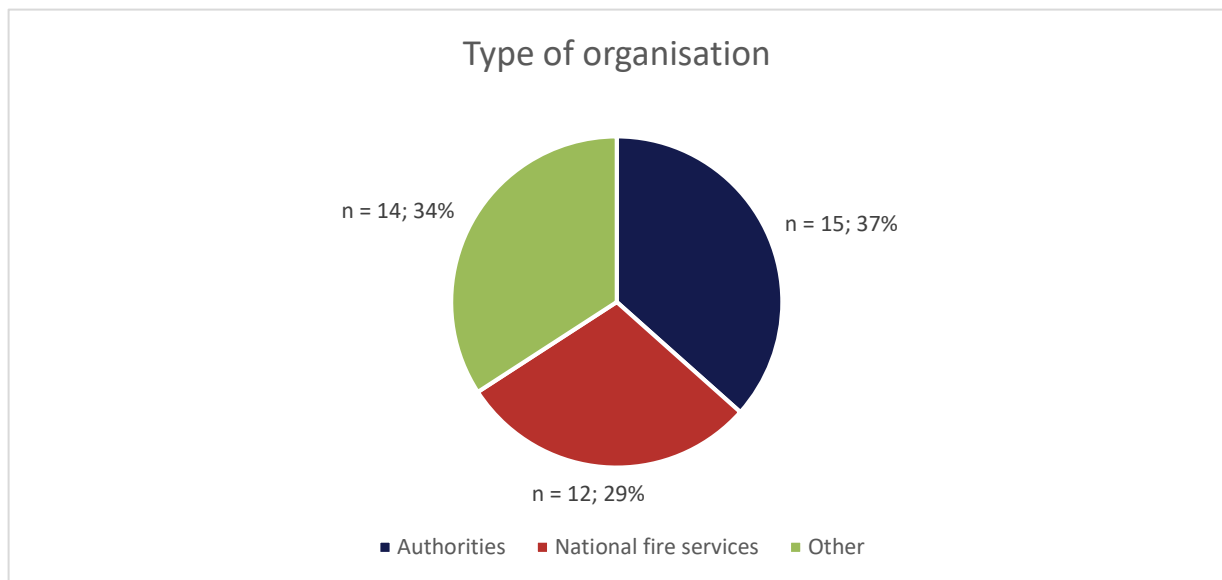
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In this section, the results of the questionnaire are analysed and discussed. First, the answers of the stakeholders in the EU Member States are thoroughly discussed. Secondly, the answers of the consortium partners are addressed. The questionnaire is included in Annex I. A detailed report of the analysis of the results is included in Annexes II and III. The responses from non-EU Member States are included in Annex II.

### 6.1. STOCKTAKING THE OPINION OF STAKEHOLDERS

In this section, we discuss the main answers of the questionnaire as given by the respondents from the different EU Member States.

For the purpose of the analysis, the respondents are clustered into three types of organizations, namely 1. Authorities 2. National fire services 3. Others. The distribution across the various types of organization is shown in Figure 6.1.



**Figure 6.1 Overview number of respondents per type of organization**

Most responses are provided from authorities and national fire services; when combined they constitute 66 % of the total responses. The response rate from these specific stakeholders is acceptable. The responses combined in 'other' were mostly from national fire associations, research bodies and insurance bodies.

6.1.1. Question 1

**Table 6.1 Scope of data collection**

	<b>Authorities</b>	<b>National fire services</b>	<b>Other</b>	<b>EU-27</b>
Response	<b>15</b>	<b>12</b>	<b>14</b>	<b>27</b>
All types of buildings	73%	83%	79%	81%
Industrial	13%	17%	29%	19%
Residential	13%	25%	29%	19%
Health care	20%	17%	14%	15%
Office	13%	17%	14%	15%
Accommodation	13%	17%	7%	11%
Detention building	13%	17%	7%	11%
Educational	13%	17%	14%	11%
Shop	13%	17%	7%	11%
(Animal) farming	0%	17%	14%	7%
Leisure	7%	8%	7%	7%
Meeting	7%	17%	7%	7%
Sport	7%	17%	7%	7%

**Q1. In practice, what types of buildings should be included in a harmonized data collection?**

**“All building types should be included in a harmonize data collection.”**

Almost all respondents answered that all building types<sup>2</sup> should be included. Other mentioned building types are: ‘industrial building’, ‘residential building’, ‘healthcare building’, ‘office building’, ‘accommodation building’, ‘detention building’, ‘education building’, ‘shop building’, ‘(animal) farming building’, ‘leisure building’, ‘meeting building’ and ‘sport building’. There are no significant differences when looking at the answers for the different types of organizations. Respondents indicated that a distinction should be made between administrative buildings and buildings from the critical infrastructure. Also, high-rise buildings, historical buildings and crowded rooms are mentioned as a standalone category or as characteristics of the listed categories. Other suggest excluding military and or fireworks factories. Two respondents suggest using similar general building types of categories but to use subcategories as well (e.g., residential and subcategories: single house, flat, apartment, etc.) which will allow the data to be examined in more detail.

<sup>2</sup> Listed in the questionnaire: residential, healthcare, accommodation, leisure, meeting, industrial, (animal) farming, office, shop, sport, educational and detection building.



## 6.1.2. Question 2

**Table 6.2 Ultimate objective of harmonised European fire statistics**

	<b>Authorities</b>	<b>National fire services</b>	<b>Other</b>	<b>EU-27</b>
Response	<b>15</b>	<b>12</b>	<b>14</b>	<b>27</b>
Identifying fire risks of products phenomena or events	73%	58%	79%	67%
Research	40%	42%	64%	59%
Supporting the education of and information for citizens	60%	42%	43%	52%
Supporting the management of fire service organizations	33%	67%	43%	52%
Cost-benefit analysis of fire safety measurements and activities	40%	58%	50%	48%
Formulation/implementation of legislation	40%	50%	14%	44%
Evaluation of existing legislation	47%	42%	21%	41%
Formulation/implementation of policy	33%	33%	29%	37%
Evaluation of existing policy	20%	33%	43%	33%
Analysis of statistics	0%	0%	0%	0%

**Q2. In your opinion, what should be the ultimate objective of harmonised European fire statistics?**

**“The ultimate objective of harmonized European fire statistics should be identifying the fire risks of products, phenomena or events.”**

Respondents were asked to select the ultimate objective of harmonized European fire statistics from a list (they could select up to four answers). The results are shown in table 6.2. For the variables regarding policy or legislation (targeting formulating / implementation or evaluation), respondents could indicate whether this should be taken at national level, EU level or both. Two thirds of the respondents indicated that ‘identifying fire risks of products, phenomena or events’ should be the ultimate objective of harmonized European fire statistics. ‘Research’ was selected by more than half of the respondents. Some other variables included in the questionnaire were also frequently selected as important objectives, varying from one third to half of the respondents per objective. Variables such as ‘formulating and evaluating policy and legislation’ were selected the least often.

There is a difference in the preferences per type of organization. The respondents from authorities indicate that ‘identifying fire risks of products, phenomena or events’ and ‘supporting the education and information for citizens’ are the most important objectives of harmonized European fire statistics. The most frequently mentioned objectives by the respondents from national fire services are ‘supporting the management of fire service organizations’, ‘cost-benefit analysis of fire safety measurements and activities’ and ‘identifying fire risks of products, phenomena or events’. The most frequently mentioned objectives by the respondents from other types of organizations are: ‘identifying fire risks of products, phenomena or events’, ‘research’ and ‘cost-benefit analysis of fire safety measurements and activities’.

**Table 6.3 Support of the formulation/implementation of policy at national or EU level**

	<b>Authorities</b>	<b>National fire services</b>	<b>Other</b>	<b>EU-27</b>
Response	<b>15</b>	<b>12</b>	<b>14</b>	<b>27</b>
Formulation/implementation of policy, at EU level	0%	8%	7%	7%
Formulation/implementation of policy, at national level	13%	0%	0%	4%
Formulation/implementation of policy, at EU and national level	20%	25%	21%	26%
Evaluation of existing policy, at EU level	7%	0%	7%	4%
Evaluation of existing policy, at national level	7%	17%	14%	7%
Evaluation of existing policy, at EU and national level	7%	17%	21%	22%
Formulation/implementation of legislation, at national level	7%	8%	0%	7%
Formulation/implementation of legislation, at EU and national level	33%	42%	14%	37%
Evaluation of existing legislation, at EU level	7%	0%	7%	7%
Evaluation of existing legislation, at national level	0%	8%	0%	0%

Table 6.3 shows that most of the respondents who have assigned the formulation and/or evaluation of policy as an ultimate objective of harmonized European fire statistics indicated that it should preferably support the formulation at both EU and national levels. Less respondents prefer the support by statistics at only the national level. In the opinion of almost all respondents, the formulation and evaluation of legislation should preferably be supported by statistics at both EU and national levels.

### 6.1.3. Question 3

**Table 6.4 Use of fire statistics for policy decisions on country level**

	<b>EU-27</b>
Response	<b>27</b>
Yes, systematically	15%
No	7%
I don't know	4%
Yes, sometimes on "ad hoc" basis	74%

**Q3. In your country, are fire statistics used for policy decisions on fire safety?**

**“In the majority of the countries, fire statistics are used for policy decisions on fire safety, mostly on an “ad hoc” basis.”**

Question 3 was focused on the use of fire statistics for policy decisions on fire safety in the different countries. In the majority of the countries, fire statistics are used for policy decisions on fire safety, mostly on an “ad hoc” basis. For half of the countries, it was mentioned that (some of the) the current legislation and/or policy decisions are based on statistics.<sup>3</sup> Based on the answers given this applies to: Belgium, Bulgaria, Denmark, Finland, France, Germany, Ireland, Italy, Lithuania, Luxembourg, the Netherlands, New Zealand, Poland, Slovakia and Sweden. For a quarter of the countries, it was mentioned that public campaigns are based on statistics, and in nearly a quarter of the countries the funding, capacity and equipping of the fire service is based on statistics. Some respondents indicated that the current (national) policymaking and/or decisions is not based upon fire statistics, but on EU Standards and British Standards, on common knowledge, or on the knowledge of several experts, on major events and their consequences, or for political reasons.

6.1.4. Question 4

**Table 6.5 Consequences of building fires**

	<b>Authorities</b>	<b>National fire services</b>	<b>Other</b>	<b>EU-27</b>
Response	<b>15</b>	<b>12</b>	<b>14</b>	<b>27</b>
Effectiveness of fire safety measures in reducing the fire	67%	75%	79%	78%
Quantification of property damage	53%	58%	57%	59%
Reason for failure of fire safety measures	53%	33%	64%	56%
Type of property damage	53%	50%	50%	56%
Direct fire costs	47%	58%	57%	52%
Environmental consequences	27%	50%	43%	37%
Fire spread at final situation	40%	33%	29%	30%
Fire spread at fire brigade arrival	27%	33%	36%	19%
Type of insurance of losses	7%	17%	7%	11%
Cost incurred to insurance companies	7%	0%	7%	7%
Indirect costs	13%	0%	7%	7%
Social consequences	7%	17%	7%	7%

**Q4. If we only focus on the consequences of building fires, which variables below are needed to provide meaningful datasets for allowing legislative and other policy decisions in your country?**

**“Over three quarters of the respondents indicated that the variable ‘effectiveness of fire safety measures in reducing the fire’ must be included in harmonized data collection.”**

In table 6.5, the results for the consequences of building fires are shown. It shows that over three quarters of the respondents indicated that the variable ‘effectiveness of fire safety measures in reducing the fire’ must be included in harmonized data collection. More than half of the respondents indicated that ‘quantification of property damage’, ‘reason for failure of fire safety measures’ and ‘type of property damage’ must be included. ‘Direct fire costs’ is mentioned by about half of the respondents.

Among all organization types ‘effectiveness of fire safety measurements in reducing the fire’ is mentioned as a must. The respondents from the fire service / executive body are less interested in ‘reason for failure of fire safety measures’ than authorities and others.

<sup>3</sup> Statistics for some countries (such as Germany) may not be applied nationally in policy making, but at the local level.

6.1.5. Question 5

**Table 6.6 Human characteristics**

	<b>Authorities</b>	<b>National fire services</b>	<b>Others</b>	<b>EU-27</b>
Response	<b>15</b>	<b>12</b>	<b>14</b>	<b>27</b>
Type of casualty	93%	92%	100%	93%
Number of victims	93%	75%	100%	89%
Number of occupants in the building	33%	58%	43%	52%
Age	53%	33%	50%	48%
Disability	40%	50%	36%	48%
Role	47%	50%	36%	48%
Type of household	27%	33%	36%	30%
Gender	33%	17%	7%	19%
Sleep / awake	27%	25%	21%	19%
Smoker / non-smoker	13%	8%	7%	15%
Drug or alcohol usage	7%	8%	7%	7%
Income category	0%	0%	7%	4%
Ethnicity	0%	0%	0%	0%
Profession	0%	0%	0%	0%

**Q5. Related to *human characteristics*, which variables are needed to provide meaningful datasets of building fires for allowing legislative and other policy decisions on fire safety in your country?**

**“Almost all respondents indicated that ‘type of casualty’ and ‘number of victims’ must be included in a harmonized data collection.”**

Given the answers of respondents related to human characteristics, of which the results are shown in table 6.6, almost all respondents indicated that ‘type of casualty’ and ‘number of victims’ must be included in a harmonized data collection. ‘Number of occupants in the building’ is mentioned by about half of the respondents. ‘Age’, ‘disability’ and ‘role’ are mentioned by less than half of the respondents. Age is mentioned by more than half of two types of organizations: authorities and by ‘other’. About a third of the Fire brigade / executive body mentioned this variable. Disability is mentioned by half of the fire brigade / executive body and by less than half by the other two types of organizations. Respondents indicated that in addition to ‘type of casualty’ (e.g. fatality or injury), there must be a distinction between deaths / fatal injury or injury (as to direct consequence of the fire). Other mentioned the classification of casualties by severity and information about the nature and extent of casualty injuries, as well as the root cause (indirect cause) of fire deaths and more information on occupants/visitors.

6.1.6. Question 6

**Table 6.7 Building characteristics**

	<b>Authorities</b>	<b>National fire services</b>	<b>Others</b>	<b>EU-27</b>
Response	<b>15</b>	<b>12</b>	<b>14</b>	<b>27</b>
Type of building	100%	83%	86%	93%
Fire safety measures present	80%	83%	79%	81%
Construction type	53%	67%	64%	70%
Number of floors	87%	67%	50%	67%
Construction characteristics	33%	42%	43%	41%
Building dimension	40%	33%	21%	37%
Floor measurement dimension	40%	17%	21%	33%
Position of inner doors	13%	33%	21%	19%
Year of construction	13%	0%	36%	19%
Ownership situation	7%	8%	7%	7%

**Q6. Related to *building characteristics***, which variables are needed to provide meaningful datasets for allowing legislative and other policy decisions on fire safety in your country?

**“Almost all respondents mentioned that ‘type of building’ must be included in harmonized data collection. ‘Fire safety measures present’ was also mentioned by a large majority of the respondents.”**

When looking at the answers given for building characteristics (shown in table 6.7), almost all respondents mentioned that ‘type of building’ must be included in harmonized data collection. ‘Fire safety measures present’ was also mentioned by a large majority of the respondents. More than half of the respondents mentioned ‘construction type’ and ‘number of floors’. Analysis of the answers given by different types of organizations resulted in the following noticeable results: ‘Number of floors’ is mentioned by most of the respondent of authorities and by (more than) half of the respondents of the national fire services.

In addition to the variable ‘fire safety measurements present’, information on the performance of fire safety systems must be included according to some respondents and the presence of a smoke detector is mentioned as well. Information on (the presence of) a fire compartment is mentioned. Escapeways (where the escapeways are useful for evacuation of people) is information that is indicated as a must. Other information was mentioned when it comes to the use or nature of the building (for a detailed description see Annex II).

6.1.7. Question 7

**Table 6.8 Fire characteristics**

	Authorities	National fire services	Others	EU-27
Response	15	12	14	27
Fire cause	87%	100%	86%	96%
Room of origin	67%	67%	79%	74%
Source of ignition	60%	92%	71%	74%
Material mainly responsible for fire development	40%	50%	29%	41%
Size of fire spread	40%	25%	21%	33%
Date	40%	25%	36%	30%
Item first ignited	27%	17%	43%	30%
Material first ignited	7%	25%	36%	26%
Speed of fire growth	27%	8%	21%	22%
Direction of fire spread	20%	17%	14%	15%
Size of smoke spread	20%	8%	7%	15%
Weather	0%	0%	7%	4%

**Q7. Related to *fire characteristics***, which variables are needed to provide meaningful datasets of building fires for allowing legislative and other policy decisions on fire safety in your country?

**“According to almost all the respondents, the ‘fire cause’ is a variable that must be included in a harmonized data collection. ‘Source of ignition’ and ‘room of origin’ of the fire’ are mentioned by almost three quarters of the respondents.”**

When looking at the results for fire characteristics (table 6.8), the ‘fire cause’ is a variable that must be included in a harmonized data collection according to almost all the respondents. ‘Room of origin’ and ‘source of ignition’, of the fire are mentioned by almost three quarters of the respondents.

There were no striking differences in the analysis per type of organization. Additional information considered to be a must by respondents was information about fire and smoke characteristics, such as: the reach of flashover, types of flames (diffusive or premixed), and toxins within the smoke. Additional information to the variable ‘fire cause’ that is considered to be a must by some respondents is the human factors relating to the cause of the fire and the root cause (indirect cause) of the fire.

### 6.1.8. Question 8

**Table 6.9 Intervention characteristics**

	Authorities	National fire services	Other	EU-27
Response	15	12	14	27
Incident location	80%	50%	50%	70%
Fire brigade response time	40%	67%	57%	56%
Fire detection time	47%	50%	50%	52%
Incident date	47%	25%	50%	52%
Incident time	47%	42%	64%	52%
Operation of fire safety measures	40%	33%	43%	44%
Fire brigade on site	27%	33%	29%	37%
Type of incident	27%	42%	29%	33%
Evacuation measures	27%	25%	29%	30%
Type of call	27%	25%	21%	26%
Number of attended fire brigade vehicles / firefighters	13%	17%	14%	19%
Occupant response time	20%	8%	29%	19%
Fire extinguishment time by fire brigade	13%	8%	21%	15%
Occupant rescue time by fire brigade	20%	33%	7%	15%
Occupant extinguishing action	7%	25%	0%	11%
Time between incident and casualty	0%	25%	7%	11%
Time between fire brigade arrival and withdrawal	7%	8%	14%	7%
Fire brigade set up time	0%	8%	7%	4%
Firefighting operations	7%	8%	0%	0%

**Q8. Related to intervention characteristics, which variables are needed to provide meaningful datasets of building fires for allowing legislative and other policy decisions on fire safety in your country?**

**“According to more than half of the respondents Incident location, ‘Fire brigade response time’ and ‘fire detection time’ are the variables that must be included in harmonized data collection. Nearly half of the stakeholders indicated ‘incident date’ and ‘fire detection time’ as important.”**

Analysis for the intervention characteristics shows (table 6.9) that ‘Incident location’, ‘Fire brigade response time’, ‘fire detection time’, ‘incident date’ and ‘incident time’ are the variables that must be included in harmonized data collection according to more than half of the respondents. ‘Incident location’ is mentioned by the majority of respondents from authorities; however, it is only mentioned by half of respondents from the national fire services and other organizations. ‘Fire brigade response time’ is mentioned by less than half of the authorities but by more than half of the other two types of organizations (fire brigade / executive body and other organizations). A minority of the respondents from the national fire services mentioned ‘incident date’, although it was mentioned by (about) half of the other two types of organizations.

Some additional information about the variable ‘equipment used’ was considered a must: specialist equipment used, type and number of equipment used, and (the type) of extinguishing agents used. Information about problems with accessibility of the building (for example difficulties with accessing / approaching the building) was mentioned as additional information regarding intervention characteristics. Furthermore, information about

the type or kind of internal or external alerting (system) was mentioned. The reinforcement of initial resources is mentioned as information that must be included about firefighting operations.

#### 6.1.9. Question 9

**Table 6.10 Fields of interest**

	<b>Authorities</b>	<b>National fire services</b>	<b>Other</b>	<b>EU-27</b>
Response	<b>15</b>	<b>12</b>	<b>14</b>	<b>27</b>
Protective measures in buildings	93%	92%	79%	89%
Health aspects	93%	58%	64%	78%
Fire safety behaviour of occupants / residents	67%	75%	43%	67%
Performance of fire service operations	53%	67%	43%	63%
Economic aspects	40%	25%	57%	44%
Environment impacts	13%	58%	36%	33%
Consumer product safety	20%	8%	50%	30%
Impact on society	0%	25%	14%	15%

**Q9. Which fields of interest should harmonised European fire statistics cover?**

**“The highest number of responses were given for ‘protective measures’ and ‘health aspects’.”**

Question 9 focusses on the field of interest that should be covered by harmonized European fire statistics. The results for this question are shown in table 6.10. The highest number of responses were given for ‘protective measures’, followed by ‘health aspects’. Fire safety behaviour’ and ‘performance operations’ were mentioned by more than half of the respondents.

When looking at the answers per organization type, the findings obtained are similar to the results for all respondents, however, with some differences worthy of discussion. ‘Fire safety behaviour’ was selected as important by less than half of the ‘other’ types of organizations, in contrast to the opinion of the authorities and national fire service to whom this is an important variable (selected by more than half of the respondents). A similar trend was found when looking at the variable ‘performance of fire service operations’.



#### 6.1.10. Question 10

**Q10. Do you feel that there are any additional statistical variables that are not covered within the previously mentioned characteristics which are needed for policymaking and/or decisions? If so, what are they?**

**“Four major areas have been classified based on the answers given by the respondents: information about fire service, information about fire incidents, fire safety systems, and the impact of fire incidents.”**

When answering the final question, respondents were given the opportunity to add any additional statistical variable(s) needed for policymaking and/or decision making that were not covered within the previously mentioned characteristics. Four major areas have been classified based on the answers given by the respondents: information about fire service, information about fire incidents, fire safety systems, and the impact of fire incidents (a more detailed description of these four areas can be found in Annex II). The EU FireStat project is mainly based on fire statistics related to pre- and post-fire conditions of buildings and information about the fire service has not been included in the analysis, even if an evaluation of such fields appear important for safety and organizational reasons. Respondents have also addressed several fields related to the description of the fire incidents. Some aspects are already covered by fire statistics. However, from the analysis of question 10, further information is required for several different themes. The responses received for fire safety measures can be classified into different themes (see Annex II). Finally, the last group of answers received is related to the impact of fire incidents. According to some respondents, health aspects and the impact on society, as well as economic impact, are fundamental for a comprehensive evaluation of the fire event and to be able to include the indirect consequences which arise once the fire is extinguished.

## 6.2. STOCKTAKING THE OPINION OF THE CONSORTIUM PARTNERS

The questionnaire, as it was distributed to the stakeholders, was also completed by all nine consortium partners. Question 3 does not apply to the consortium, because they do not represent a country. Therefore this question is not included in this section; nor is question 10 included in the analysis as no answers were given for that question.

Regarding the scope of the data collection, respondents were asked to select the type(s) of buildings that should be included in data collection. Almost all respondents (8/9) indicated that all type of buildings should be included in the data collection. Residential, healthcare, industrial and educational buildings were mentioned one time. Additionally, one partner added ‘hotels (commercial accommodation)’ by filling in the ‘others, namely’ field.

As regards the fields of interest that should be covered by harmonized European fire statistics, respondents selected an average of two variables. Four or less of the most imported variables listed in the questionnaire could be selected by the respondents and there was also the possibility to add a variable that was not mentioned in the list if the respondent thought this an important variable. All of the respondents indicated that harmonized European fire statistics should cover the field of protective measures in buildings. Almost half (4/9) of the respondents indicated that harmonized European fire statistics should cover the performance of fire service organizations. One-third of the respondents mentioned the consumer product safety as the field of interests that should be covered. Three variables were mentioned once: the impact on society, the fire safety behaviour of occupants/residents, and health aspects.

Respondents were also asked to indicate what the ultimate objective of harmonized European fire statistics should be. They could select four or less of the nine variables listed in the questionnaire or they could add another variable of their preferences that was not listed. The respondents selected an average of three variables. Over two-third (7/9) of the respondents indicated that research should be the ultimate objective of harmonized European fire statistics. More than half (5/9) of the respondents mentioned the evaluation of existing policy. Four out of these five respondents indicated that the harmonized European fire statistics’ ultimate objective should be supporting the evaluation of existing policy on both EU and national levels. One respondent indicated that this should be done on a national level. Almost half (4/9) of the respondents indicated

that the formulation and implementation of policy should be the ultimate objective of harmonized European fire statistic. Three out of these four respondents indicated that the harmonized European fire statistics should support the formulation and implementation of policy on both EU and national levels. One respondent indicated that this should be done on at EU level. Moreover, almost half (4/9) of the respondents indicated that supporting the management of fire service organizations should be the ultimate objective of harmonized European fire statistic.

Respondents were asked to select which variables must be collected with regards to the consequences of building fires. The respondents selected an average of two variables for must. Two-third (6/9) of the respondents indicated that the fire spread at the final situation must be included to provide meaningful datasets for allowing legislative and other policy decisions. Almost half (4/9) of the respondents mentioned the fire spread at the time of the fire brigade arrival. The following variables were mentioned once: type of property damage, quantification of property damage, effectiveness of fire safety measures, and the costs incurred by insurance companies. 'Direct fire costs', 'indirect fire costs', 'type of insurance of losses', 'environmental consequences' and 'social consequences' were not categorized as a must by the respondents. Annex II describes the variables selected for should and could for questions 4 to 8.

Regarding human characteristics, the respondents selected an average of four variables for must. All respondents indicated that 'number of victims' must be included in harmonized data collection. Most of the respondents indicated that 'age' must be included (7/9). More than half of the respondents mentioned 'gender'. 'Drug or alcohol usage' is mentioned by a third of the respondents. Other variables: 'type of causality' (mentioned only once), 'sleep / awake', 'smoker / non-smoker', 'disability' and 'type of household' were mentioned by two or less respondents. The 'number of victims', 'number of occupants present in the building', 'role', 'ethnicity', 'profession' and 'income category' were not categorized as a must by the respondents.

Variables regarding building characteristics related to building fires that must be included to provide meaningful datasets were also selected by the respondents. They selected an average of one variable for must. Almost half of the respondents (4/9) mentioned 'number of floors' as data that must be collected. Some variables are mentioned by two respondents: 'building dimension', 'position of inner doors' and 'year of construction'. Variables mentioned only once are: 'type of building' and 'fire safety measures present'. 'Construction type', 'construction characteristics', 'floor measurement (m<sup>2</sup>) dimension' and 'ownership situation' are not categorized as a must by the respondents.

Regarding the fire characteristics related to building fires, respondents selected the variables that must be included. The respondents selected an average of five variables for must. Almost all respondents (8/9) mentioned 'room of origin' as a variable that must be included in harmonized data collection. Also, 'fire cause' (7/9), 'item first ignited' (6/9) and 'source of ignition' (6/9) was mentioned by most of the respondents. Other variables were mentioned by less than half of the respondents: 'material mainly responsible for the fire development' (4/9) and 'size of smoke spread' (4/9), or by a couple of them. 'Speed of fire growth', 'direction of fire spread (horizontally or vertically)' and 'weather' were not characterized by respondents as a must.

Variables that must be collected with regards to intervention characteristics related to building fires were then selected. The respondents selected an average of three variables for must. More than half of the respondents (5/9) indicated that 'incident data' must be included in harmonized data collection. Other variables mentioned by less than half of the respondents (3/9) were: 'incident time', 'incident location', 'type of call', 'fire brigade on site' and 'number of vehicles / firefighters'. Variables mentioned once are: 'fire detection time' and 'occupant response time'. 'Fire brigade response time', 'fire extinguishment time by fire brigade' and 'time between incident and casualty' were also mentioned once. One respondent mentioned 'fire brigade set up time', another respondent indicated 'occupant response time by fire brigade' and yet another one selected 'occupant extinguishing action'. 'Type of incident (deliberate or accidental)', 'time between fire brigade arrival and withdrawal', 'firefighting operations', 'operation of fire safety measures' and 'evacuation measures' were not characterized by respondents as a must.

## 7. SURVEY DATA ANALYSIS

The proposal developed in this task is generally based on the opinions from the stakeholders and compared with the data already collected by the EU Member States (extracted from Tasks 0 & 1) and the opinion of the consortium partners.

### 7.1. COMPARISON BETWEEN STAKEHOLDERS AND CONSORTIUM ANSWERS

It is noticeable that the consortium partners selected significantly fewer variables to include in the data collection than the stakeholders did. Where the stakeholders selected on average (almost) the maximum number of variables per question, the consortium partners only chose more variables for the human characteristics and the fire characteristics. The fewest variables were selected for the building characteristics, namely an average of one per respondent.

#### 7.1.1. Fields of interest to be covered by harmonized European fire statistics

The majority of the stakeholders indicated that the variable 'protective measures in buildings' needs to be included in data collection, see figure 7.1.

All partners consider this important. The stakeholders also indicated that 'health aspects' (78 %), 'fire safety behaviour of occupants' (67 %) and 'performance of fire service operations' (63 %) are important variables to collect. The last mentioned variable was also selected by less than half of the consortium partners (44 %), unlike the two first mentioned variables. 'Economic aspects' was selected by 44 % of the stakeholders but by none of the partners.

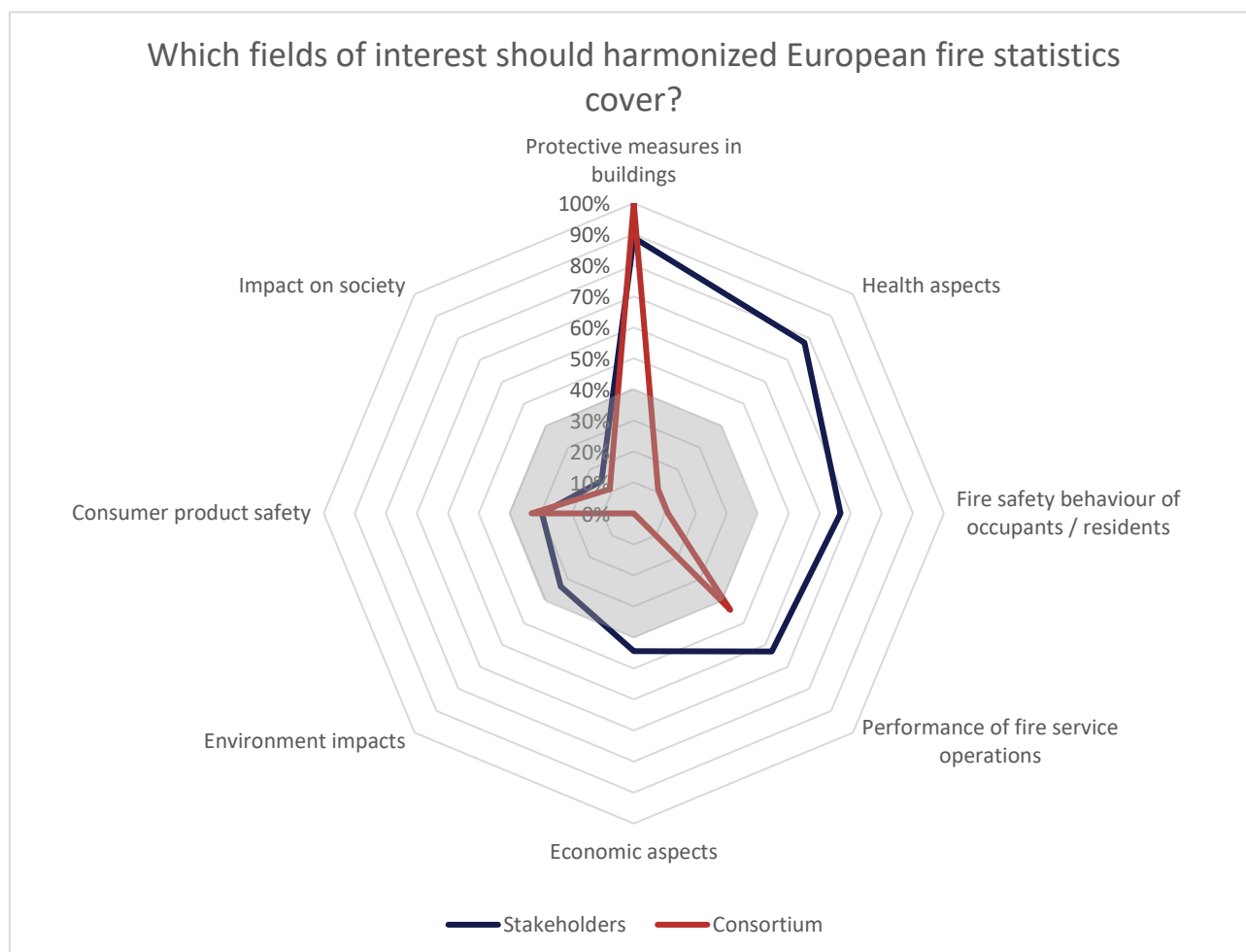
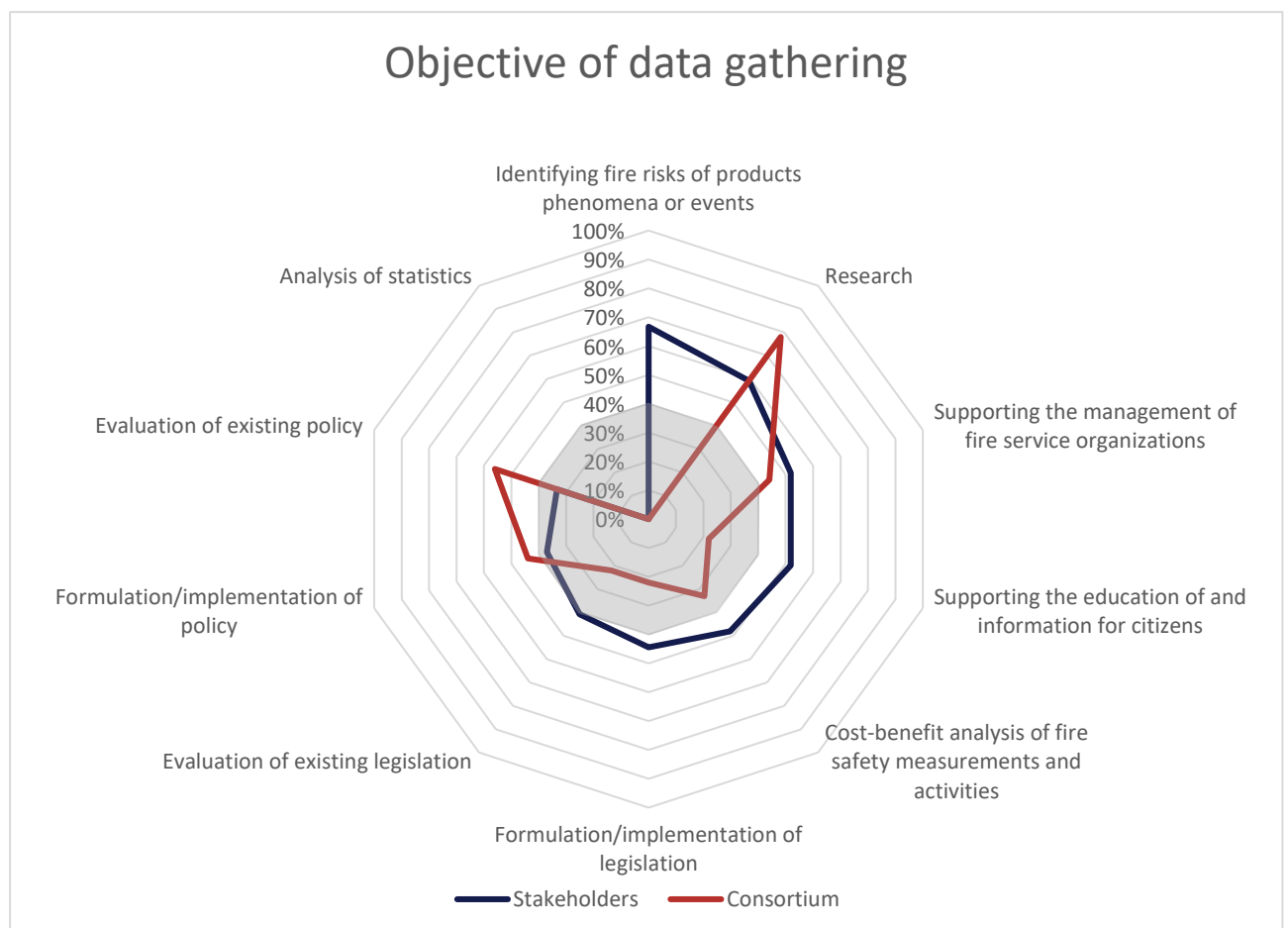


Figure 7.1 Overview of variables often selected by the respondents for fields of interest

### 7.1.2. Objective of harmonized European fire statistics

Figure 7.2 shows that most of the stakeholders consider that ‘identifying the fire risks of product, phenomena or events’ (67 %) is the ultimate objective of harmonized European fire statistics. This variable is not mentioned by the consortium partners. More than half of the stakeholders mentioned ‘supporting the education of and information for citizens’ (52 %), ‘supporting the management of the fire service organizations’ (52 %) and ‘research’ (59 %). Research is also mentioned by most of the consortium partners (78 %) as well as ‘supporting the management of the fire service organizations’ (44 %). Figure 7.2 shows an overview of the most often selected variables.

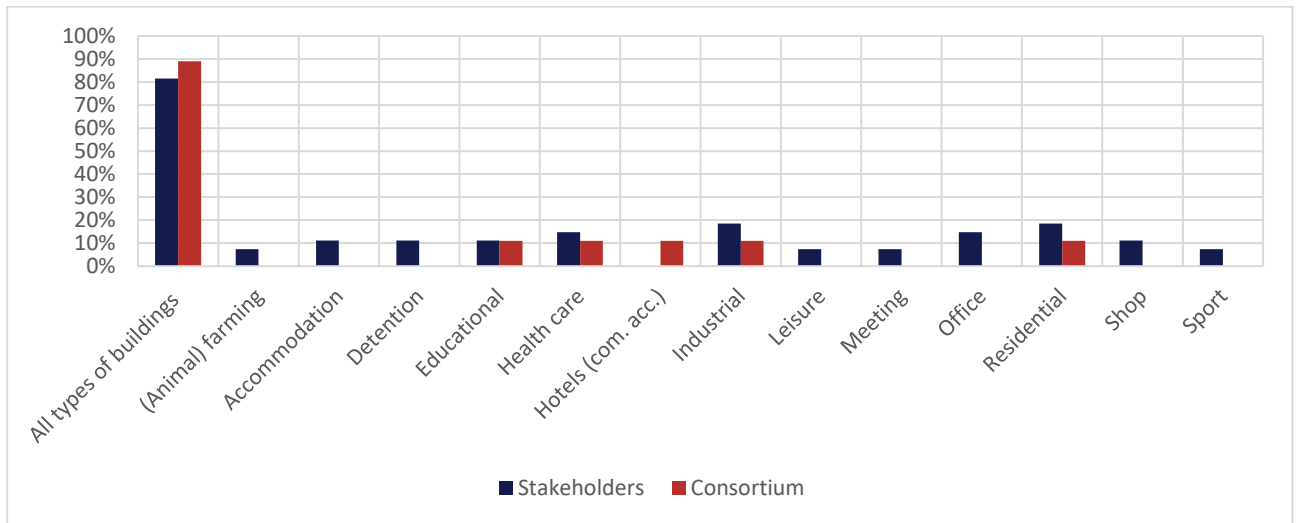
Half of the stakeholders indicated that (some of) the current legislation and/or policy decisions are based on statistics, and a quarter of the stakeholders indicated that the funding, capacity and equipping of the fire services is based on statistics. The objectives ‘evaluation of existing policy’ and ‘formulation/ implementation of policy’ were selected by most of the consortium partners (56 % and 44 %) and by less than 40 % of the stakeholders. The objective of ‘supporting the education of and information for citizens’ was selected by half (52 %) of the stakeholders. They indicated that public campaigns on fire safety are based on statistics. Nearly half of the stakeholders selected ‘cost- benefit analysis of fire safety measurements and activities’ (48 %). The variables ‘formulation and implementation of legislation’ and ‘evaluation of existing policy’ were selected by about 40 % of the stakeholders, but by less than 40 % of the consortium partners.



**Figure 7.2 Overview of variables often selected by the respondents for the objective of data gathering**

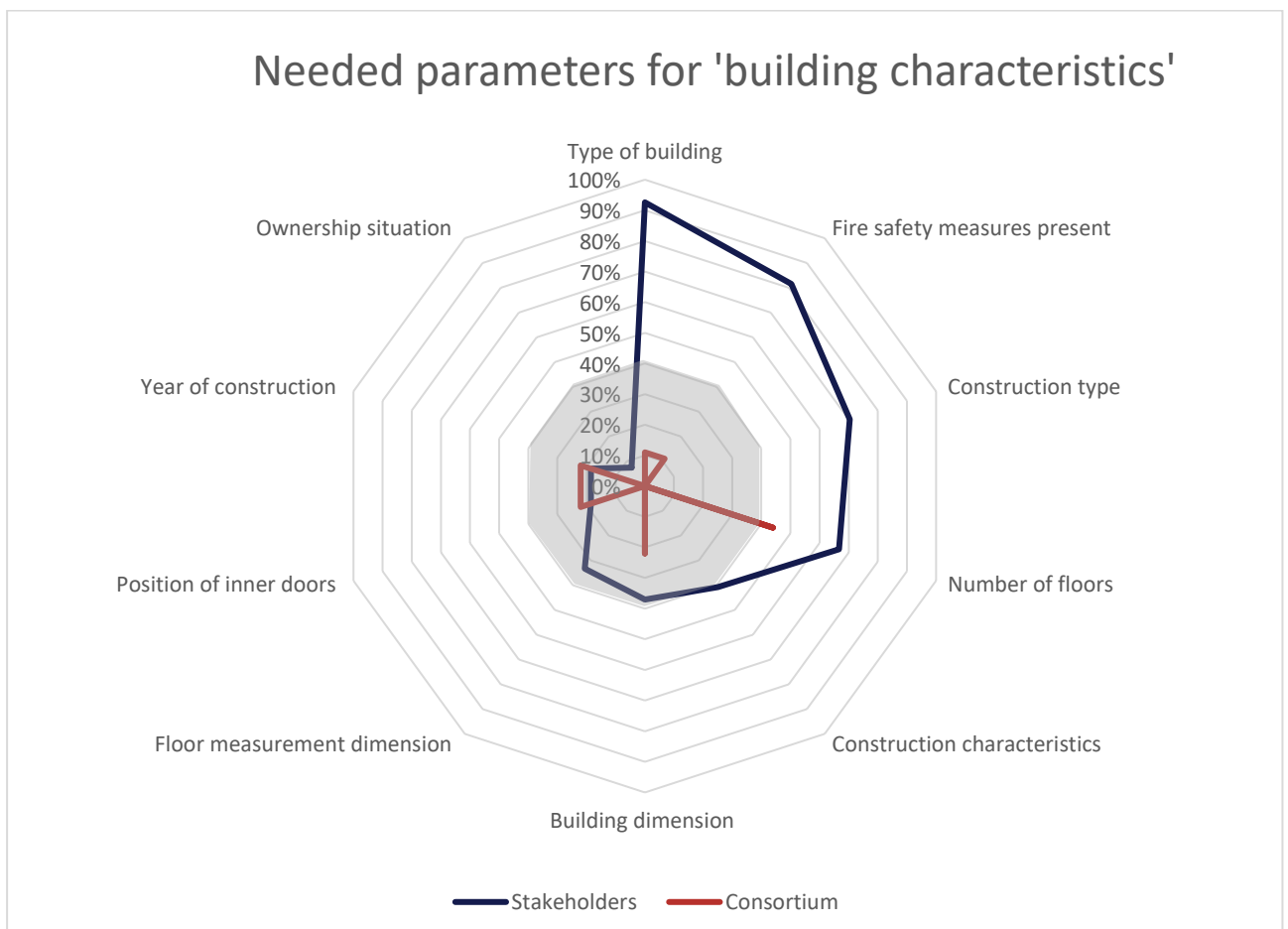
### 7.1.3. Scope / type of buildings and characteristics

As both the consortium partners and the stakeholders indicated that all type of buildings must be included in the harmonized data collection, the preference of the stakeholders is justified because of the confirmation by the partners. Figure 7.3 shows an overview of the most often-selected variables regarding the types of buildings.



**Figure 7.3 Overview of the types of buildings / scope selected by the respondents**

Figure 7.4 shows the results for building characteristics. The stakeholders' opinion was that the variables 'type of building' and 'fire safety measures present' are most important (both mentioned by more than 80 %). Also mentioned by the stakeholders were 'construction type' (70 %), 'number of floors' (67 %) and 'construction characteristics' (41 %). None of the variables were selected by more than half of the consortium partners, although 'number of floors' is mentioned by just less than half of the consortium partners (44 %).



**Figure 7.4 Overview of the variables often selected by the respondents for building characteristics**

#### 7.1.4. Human characteristics

Figure 7.5 shows that almost all stakeholders selected the variables 'type of casualty' and 'number of victims' to be essential for data collection. 'Type of casualty' is not mentioned often by the consortium partners, however all partners mentioned 'number of victims'. Therefore 'number of victims' is justified. In addition, the consortium partners mentioned 'age' (78 %) and 'gender' is mentioned by more than half (56 %). The variable 'age' is also mentioned by less than half of the stakeholders (48 %). The same applies to 'role of occupants' (48 %), which however is not mentioned by the consortium partners. Finally, 'gender' is not mentioned often by the stakeholders. 'Number of occupants in the building' (52 %) and 'disability' (48 %) are mentioned by the stakeholders, however these variables are not mentioned by the consortium.

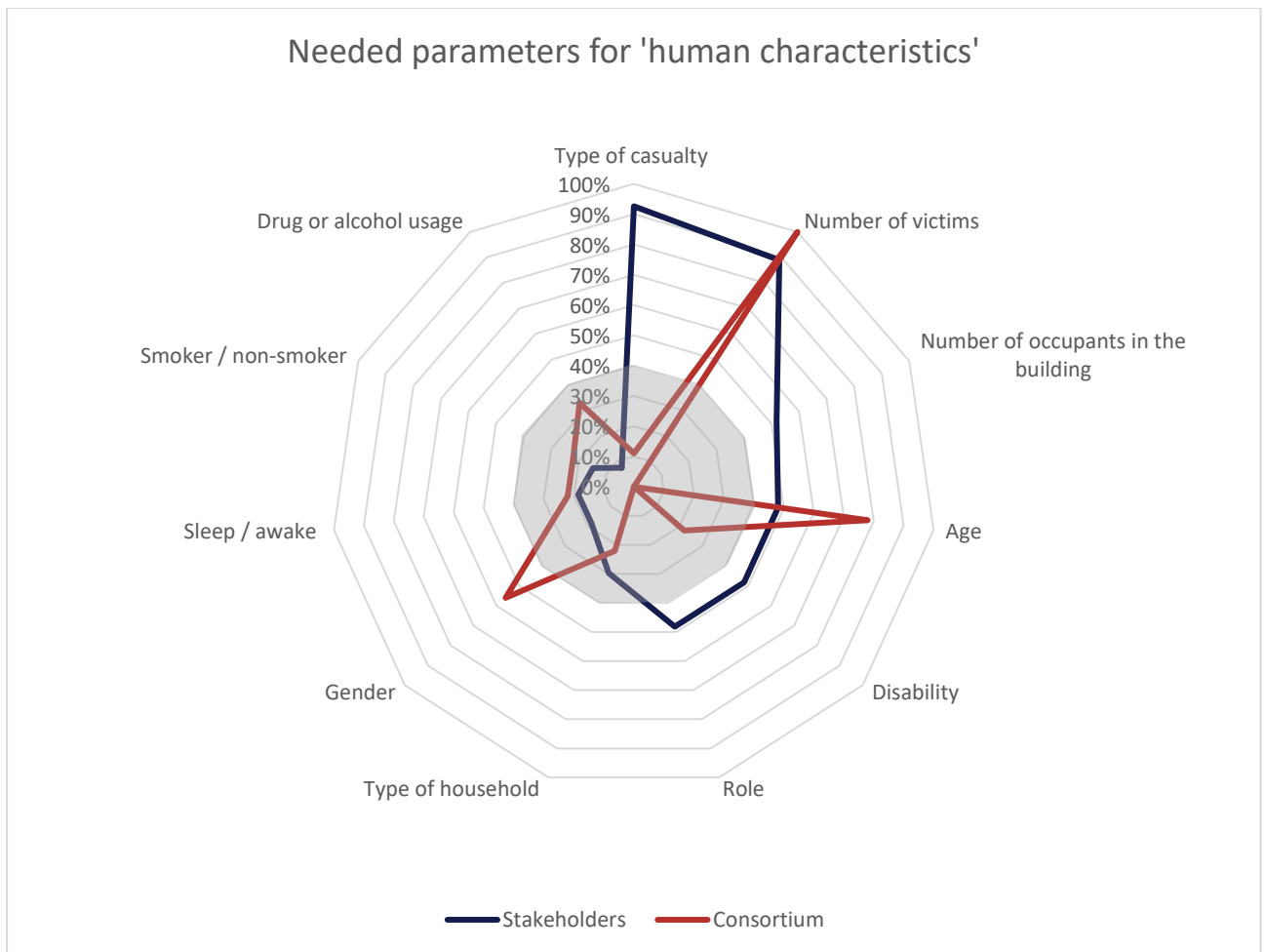
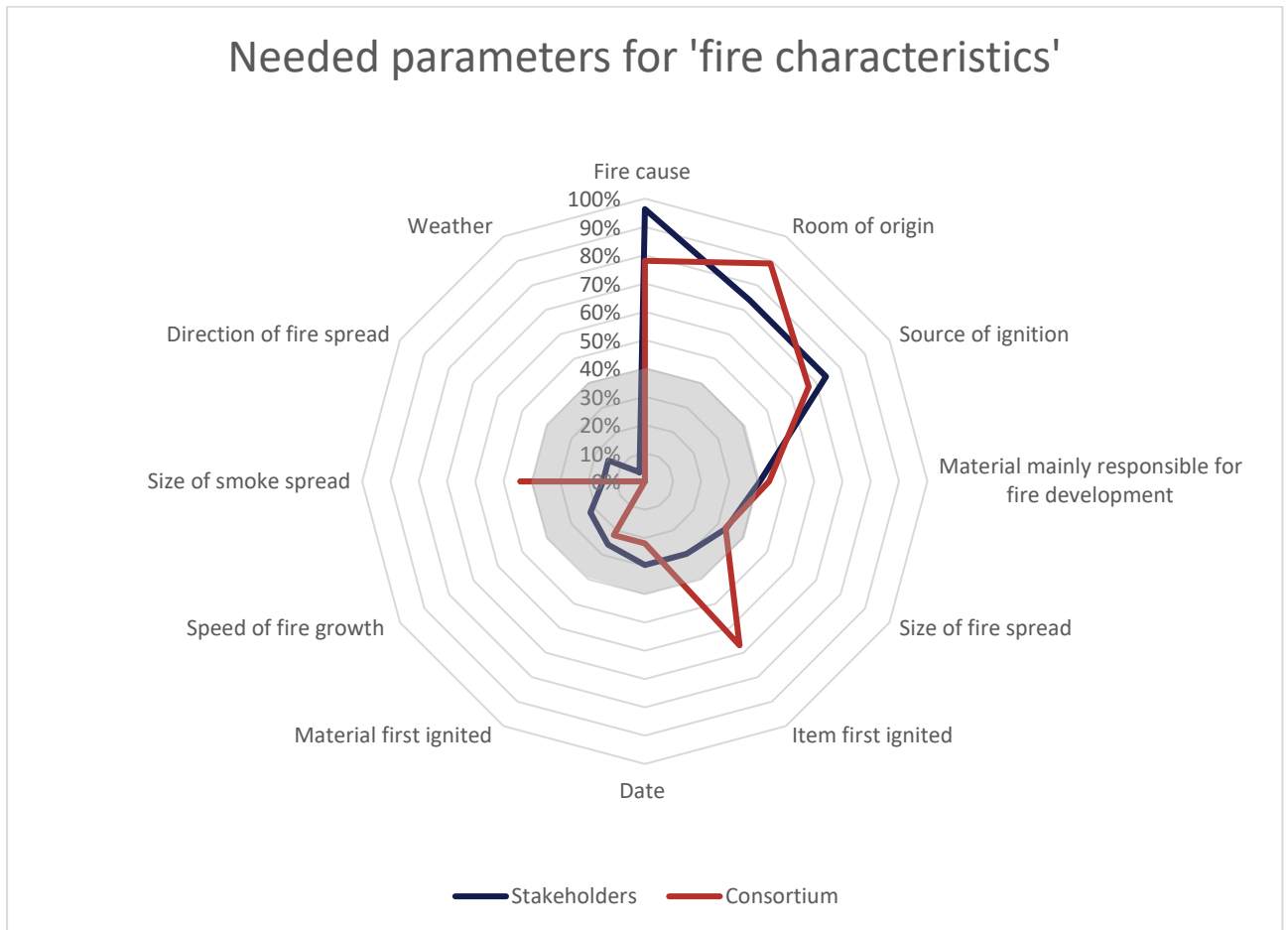


Figure 7.5 Overview of the variables often selected by the respondents for human characteristics

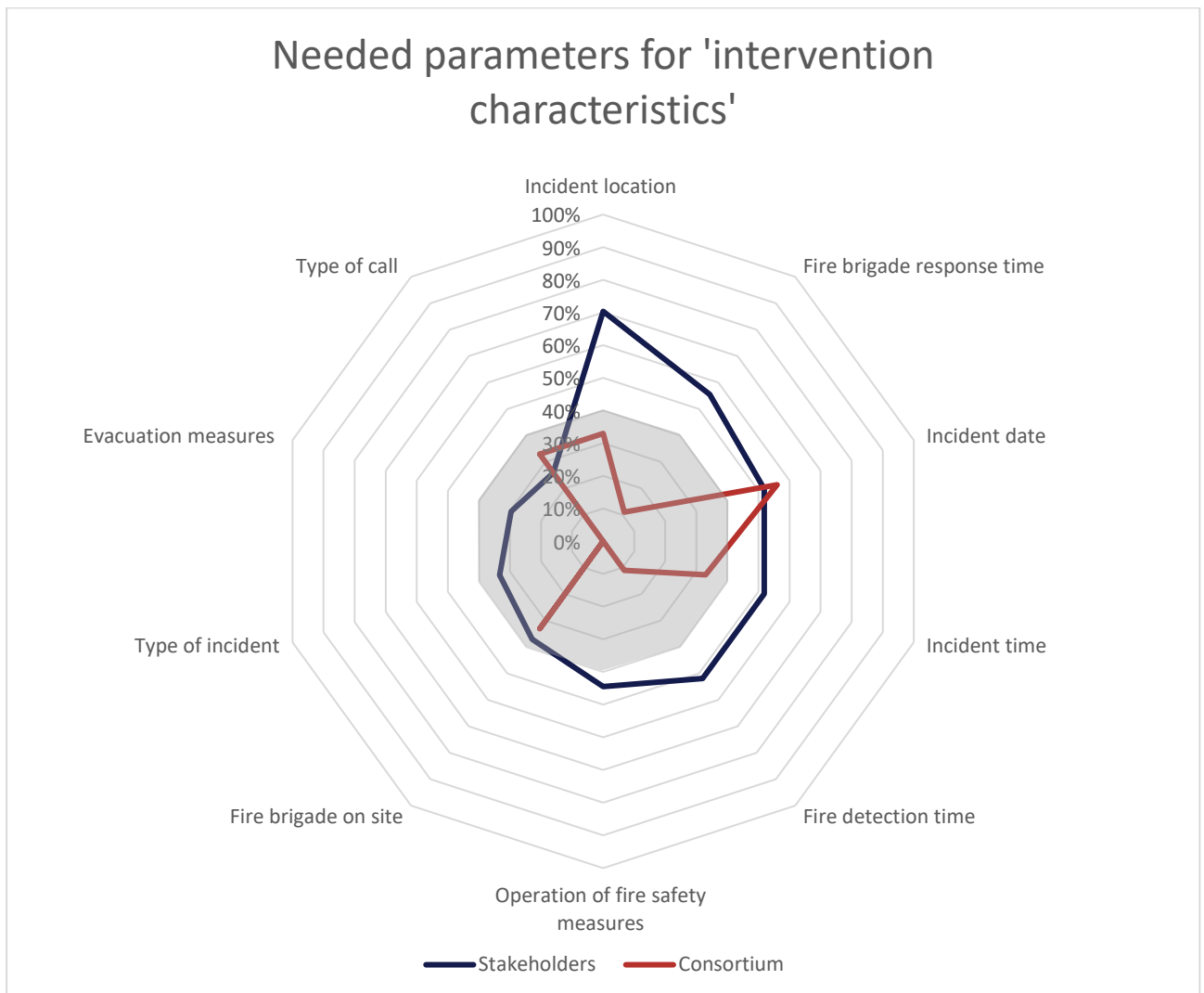
### 7.1.5. Fire characteristics



**Figure 7.6 Overview of the variables often selected for fire characteristics**

Figure 7.6 shows that almost all partners and stakeholders indicated that 'fire cause', 'source of ignition' and 'room of origin' are important. Therefore, these three variables are justified. The consortium partners mentioned 'item first ignited' as an important variable (67%), but the stakeholders did not mention this variable often (30%). The variables 'size of smoke spread' and 'material mainly responsible for fire development' were mentioned by less than half of the consortium partners (44%), however these variables are not mentioned often by the stakeholders.

### 7.1.6. Intervention characteristics

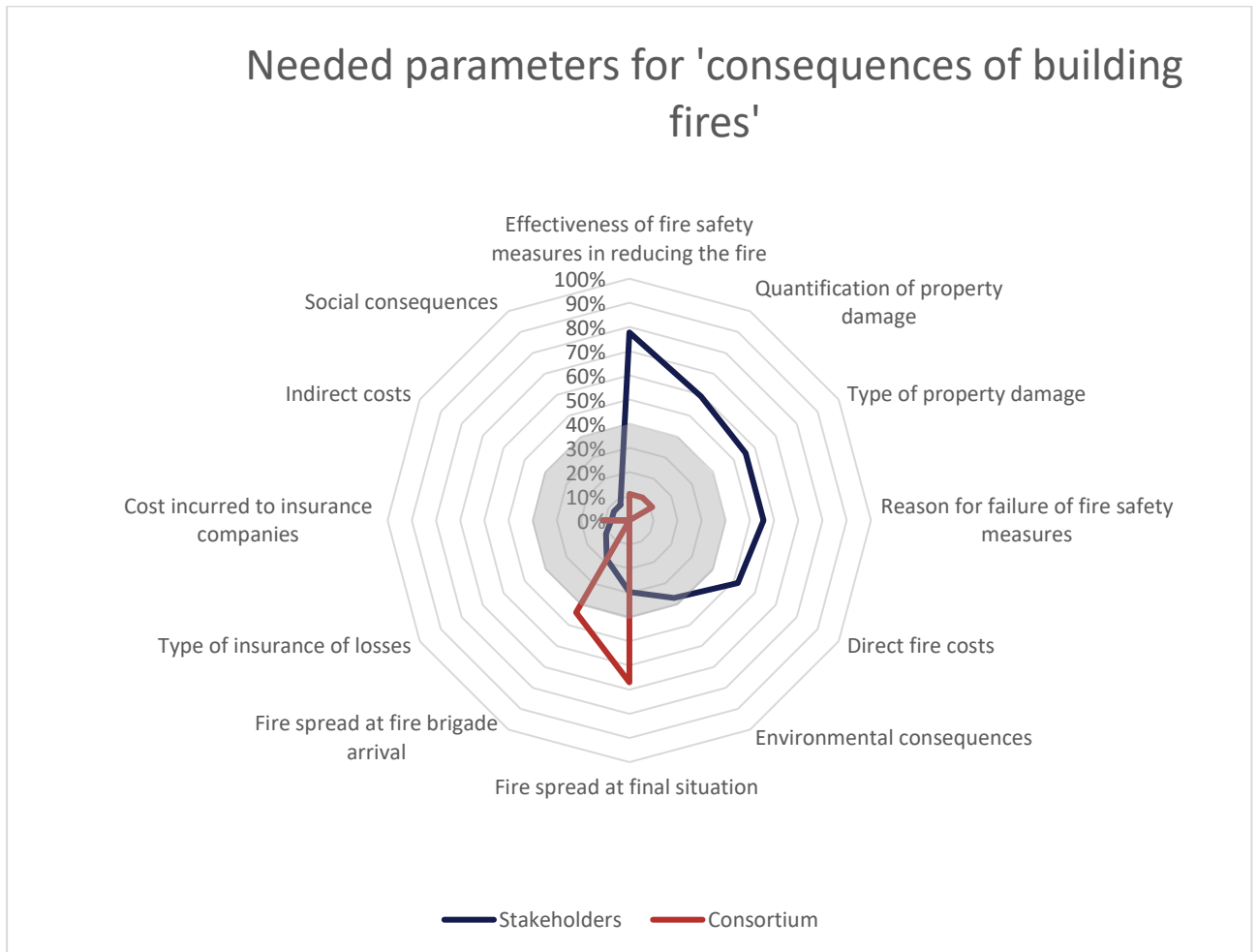


**Figure 7.7 Overview of the variables often selected by the respondents for intervention characteristics**

Figure 7.7 shows that the majority of the stakeholders consider that 'incident location' is the most important fire statistic to collect, as well as 'fire brigade response time' (56 %). More than half of the stakeholders (52 %) mentioned 'incident date', 'Incident time' and 'fire detection time'. More than half of the consortium (56 %) selected 'incident date'. The other variables are not indicated as important by the consortium partners. 'Operation of fire safety measures' is mentioned by less than half of the stakeholders (44 %), however it is not mentioned by the consortium.



### 7.1.7. Consequences of building fires



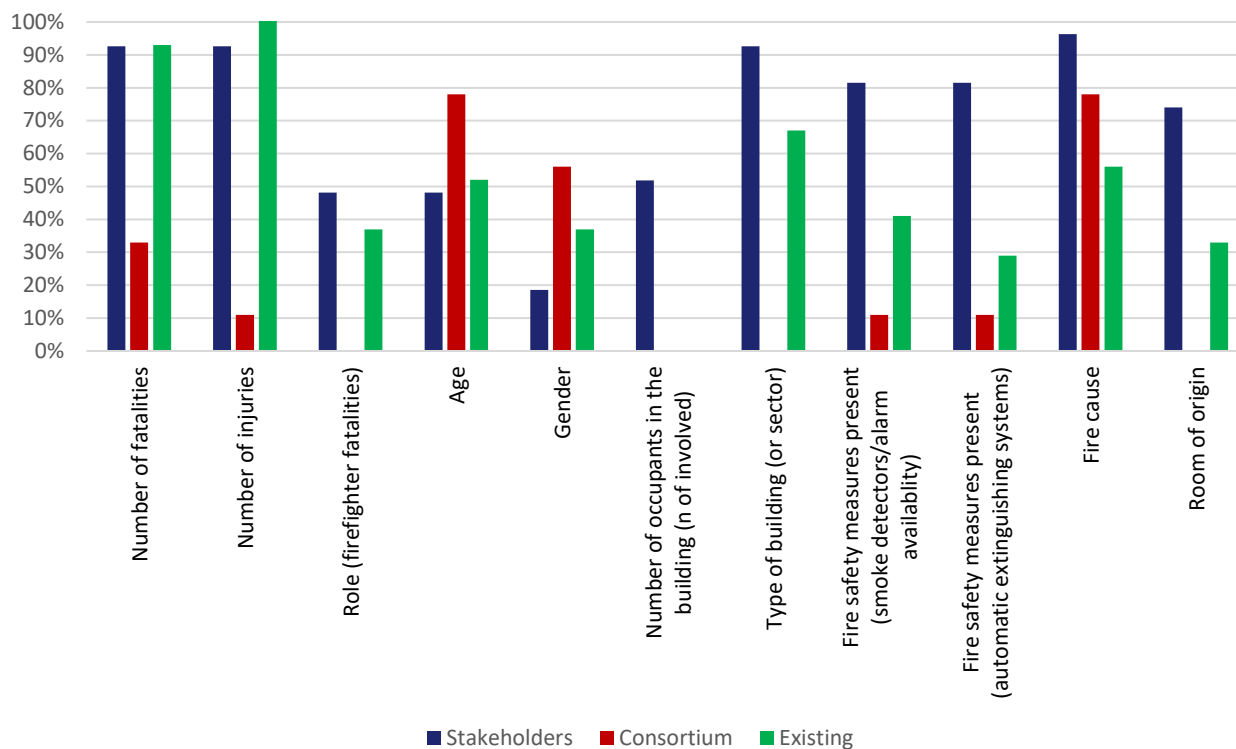
**Figure 7.8 Overview of variables often selected by the respondents for the consequences of building fires**

Figure 7.8 shows that most stakeholders indicated 'effectiveness of fire safety measures in reducing the fire' as the most important to collect. 'Quantification of property damage' (59 %), 'direct fire costs' (52 %), 'reason for failure of fire safety measures' (56 %) and 'type of property damage' (56 %) were also noted as a must to collect by more than half of the respondents. None of these variables are justified in the opinion of the consortium partners as they indicated (67 %) that the 'fire spread at the final situation' must be included. Another variable mentioned by slightly less than half of the consortium partners was 'fire spread at the time of the fire brigade arrival' (44 %).

### 7.2. COMPARISON WITH VARIABLES ALREADY COLLECTED

A review of data collected in the EU Member States (EU-27) was made in Task 1 report. The results of these reviews were extracted and used in the current analysis. Note that Task 1 report has information from 77% of the EU countries. The variables displayed in the questionnaire are compared with the data already collected (figures 7.9 and 7.10).

Figure 7.9 shows an overview of the data about human characteristics, fire characteristics and building characteristics the results of task based on the results of the questionnaire among stakeholders and the results of stocktaking (consortium partners).



**Figure 7.9 Comparison between variables indicated by stakeholders, the consortium, and data collected by EU Member States for human, building and fire characteristics**

In relation to human characteristics, the stakeholders indicated that ‘type of casualty’ and ‘number of victims’ are the most needed to provide meaningful datasets for allowing legislative and other policy decisions in their country. When looking at the results of tasks 0 & 1, nearly all countries are collecting data about the number of fatalities and about half of the countries are collecting data about the number of injuries by fire. This implies that the variables that stakeholders consider necessary are supported as they are currently being collected by many countries.

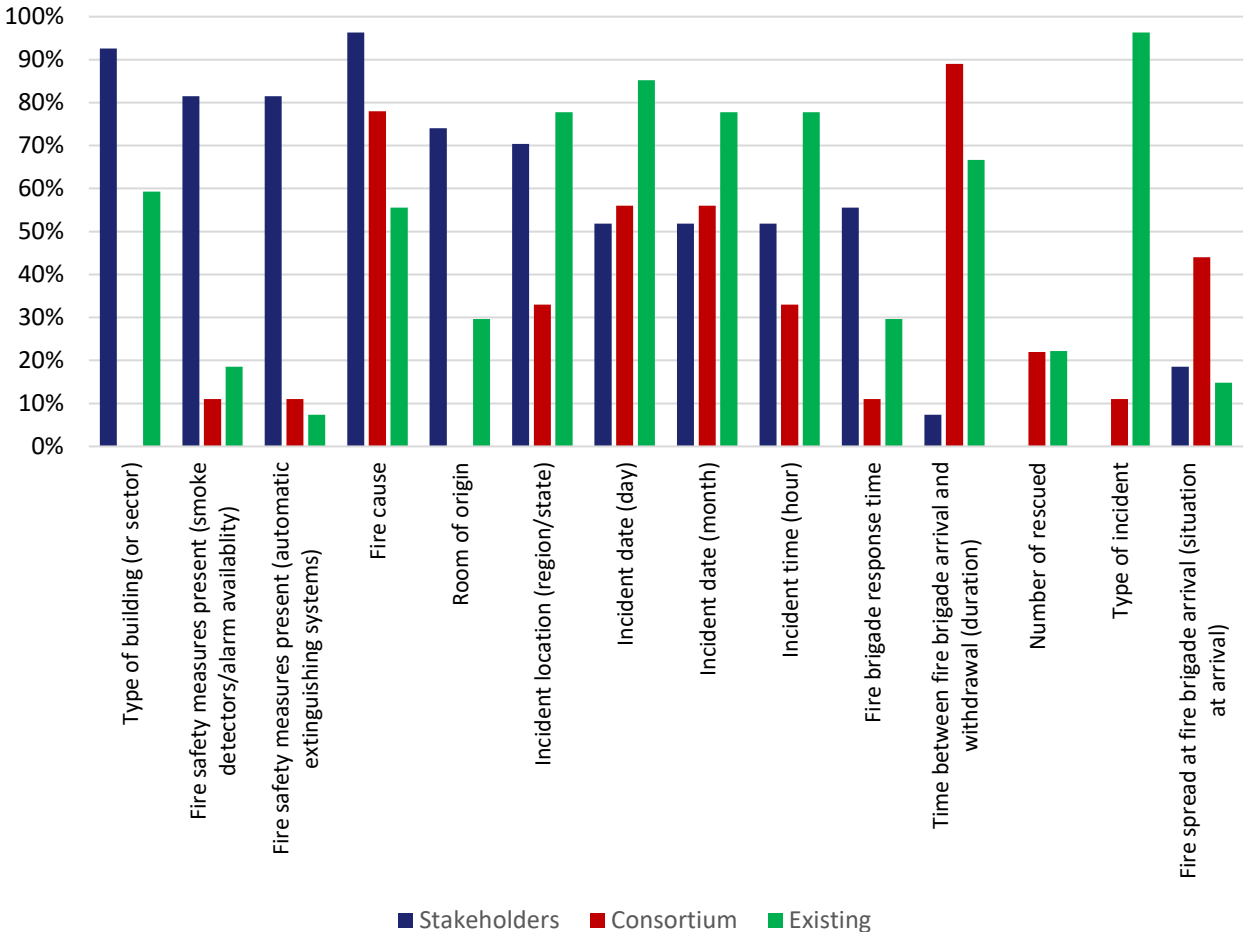
The victim’s ‘role’ (48 %) and ‘age’ (48 %) are mentioned by nearly half of the stakeholders, and ‘age’ is mentioned by the vast majority (78 %) of the consortium partners. Many countries currently already collect data on the victims’ ‘age’ (52 %) but not on the ‘role’ (22 %). ‘Gender’ is mentioned by the majority of the consortium partners (56 %), however few (37 %) of the countries collect data on this variable. The variables ‘number of occupants in the building’ / ‘number of involved’ was mentioned by about half of the stakeholders, however, not by the consortium, nor are many EU Member States collecting this data.

In relation to building characteristics, the stakeholders indicated that ‘type of building’ and ‘fire safety measures present’ must be collected in a fire statistics database. The majority of the EU Member States are also collecting data about the type of building. Data about smoke detectors/alarm is also collected by many countries (41%). Therefore, the variable ‘type of building’ and ‘fire safety measures present’ are supported by both stakeholders and the current data collection by the EU-27. Two variables selected by more than half of the stakeholders – ‘number of floors’, ‘construction characteristics’ and ‘construction type’ – are collected by few countries according to the results of tasks 0 & 1 and are therefore not supported.

In relation to fire characteristics, the stakeholders indicated that the variables ‘fire cause’ (96 %), ‘source of ignition’ (74 %) and ‘room of origin’ (74 %) are important. ‘Fire cause’ is supported by the current data collection by the EU-27, where 15 of 27 (56%) of the countries already collect data about the cause of the fire and it is selected by the majority of the consortium partners. According to the result of tasks 0 & 1, only a 9 of 27 (33%) countries are currently collecting data about the room of origin.

The variables 'item first ignited' and 'source of ignition' are mentioned by the majority of the consortium partners but are collected by few countries (<40%) according to the results of tasks 0 & 1, nor are they mentioned by the majority of the stakeholders.

Figure 7.10 below shows an overview of the data about intervention characteristics and the consequences of building fires for the results of tasks 0 & 1, the results of the questionnaire among the stakeholders, and the results of stocktaking (consortium partners).



**Figure 7.10 Comparison between variables indicated by stakeholders, the consortium, and data collected by EU Member States for intervention characteristics and consequences of building fires**

For intervention characteristics, the stakeholders' general opinion is that 'incident location', 'incident date', 'incident time' and 'fire brigade response time' must be collected in a fire statistics database. Less than half of the EU-27 collects data about the fire brigade response time and is therefore not supported by the current data collection. Over three-quarters of the countries already collect data on the other variables. It appears that 'incident date' is supported by both the consortium partners and the current data collection by EU-27.

Data on the variable 'time between fire brigade arrival and withdrawal' is pointed out as being already collected by about two-third of the countries (67 %), and 89 % of the consortium selected it, but it is not indicated by the stakeholders. As regards the variable 'number of rescued', on which data is collected by 22 % of the EU-27, this variable was not included in the questionnaire and therefore no comparison can be made.

Regarding the consequences of building fires, approximately more than two thirds of the stakeholders stated that 'effectiveness of fire safety measures in reducing the fire' is a variable that must be included in the data collection. Also, the variables 'quantification of property damage', 'direct fire costs', 'reason for failure of fire

safety measures' and 'type of property damage' were indicated as being important by (slightly) more than half of the stakeholders. Only about a quarter of the countries collect data on the direct fire costs and this implies that the variable, that the majority of the stakeholders consider necessary, is not supported by the current data collection by EU-27. The other mentioned variables are not supported because only a small percentage of the countries collect data on those variables. 'Fire spread at fire brigade arrival is a variable mentioned by 44 % of the consortium partners (fire spread at final situation by 67 % of the consortium). The results of tasks 0 show that only few (18 %) of the countries already collect this (fire spread at fire brigade arrival). Therefore, this variable is not supported by the current data collection by the EU-27.

A crosscheck of the variables with the results of task 0 shows that there are similarities without consequences for the justification process. For some variables, there are small differences in the percentages of how many countries already collect data for specific variables but this does not influence the results. For two variables: 'Fire brigade response time' and 'Fire safety measures present: smoke alarm system<sup>4</sup>', the results of task 1 show that they were collected by more than 40% of the countries. However, the results of task 0 indicate that both variables were collected by less than 40% of the countries. The former estimation is more accurate and is then selected.

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<sup>4</sup> Described in task 1 as 'alarms presence'.

## 8. OVERVIEW AND STRENGTHS AND LIMITATIONS

The main findings from previous sections are described in this section as a prelude to a proposal about which fire data needs to be collected in all EU Member States.

### 8.1. OVERVIEW OF SURVEY RESULTS

Tables 8.1 and 8.2 below show an overview of the results from the survey among the stakeholders (aggregation to 27 responses) and the consortium (9 respondents), and from the survey responses on existing data collection in the 27 EU Member States<sup>5</sup>.

**Table 8.1 Overview of the survey result (part 1 of 2)**

Aspect	Variable	Confirmed by majority of stakeholders	Confirmed by majority of consortium	Collected by majority of EU-27 (based on task 1)
Scope	All types of buildings	Yes, 81 %	Yes, 89 %	Yes, 59 %
Objective	Research	Yes, 59 %	Yes, 78 %	No
	Supporting the management of fire service organizations	Yes, 52 %	Yes, 44 %	No
	Identifying fire risks of products phenomena or events	Yes, 67 %	No, 0 %	No
	Supporting the education of and information for citizens	Yes, 52 %	No, 22 %	No
	Cost-benefit analysis of fire safety measurements and activities	Yes, 48 %	No, 33 %	No
	Formulation/implementation of legislation	Yes, 44 %	No, 22 %	No
	Evaluation of existing legislation	Yes, 41 %	No, 22 %	No
	Evaluation of existing policy	No, 33 %	Yes, 56 %	No
	Formulation/implementation of policy	No, 37 %	Yes, 44 %	No
Field of interest to be covered	Protective measures in buildings	Yes, 89 %	Yes, 100 %	No
	Performance of fire service operations	Yes, 63 %	Yes, 44 %	No
	Health aspects	Yes, 78 %	No, 11 %	No
	Fire safety behaviour of occupants / residents	Yes, 67 %	No, 11 %	No
	Economic aspects	Yes, 44 %	No, 0 %	No

*Note: Green = selected by 50 % or more, orange = selected by 40-49 %, red = selected by less than 40 %.*

*For example, supporting the education of, and information for, citizens was selected by 52 % of the stakeholders, but not confirmed by the consortium (indicated with 'no') because only 22% of the consortium selected this variable. This percentage is lower than the threshold value (selected by 40 % or more) of the selection criteria. In addition, this variable is not collected by the EU-27 based on the results of task 1 (indicated with 'no'), and therefore no percentage is shown in the table.*

<sup>5</sup> A crosscheck with the results of task 0 shows that, in general, there are no changes to the colour categories when comparing the results of task 0 & 1.

**Table 8.2 Overview of the survey result (part 2 of 2)**

Aspect	Variable	Confirmed by majority of stakeholders	Confirmed by majority of consortium	Collected by majority of EU-27 (based on task 1)
Human characteristics	Number of victims	Yes, 89 %	Yes, 100 %	Yes, 93 % and 52 %*
	Type of casualty (e.g. fatality or injury)	Yes, 93 %	No, 11 %	
	Number of occupants in the building	Yes, 52 %	No, 0 %	No, 19 %
	Age	Yes, 48 %	Yes, 78 %	Yes, 52 %
	Gender	No, 19 %	Yes, 56 %	No, 37 %
	Disability	Yes, 48 %	No, 22 %	No, 26%
Building characteristics	Role (e.g. occupant or firefighter)	Yes, 48 %	No, 0 %	No, 37 %
	Type of building (e.g. residential)	Yes, 93 %	No, 11 %	Yes, 67 %
	Fire safety measures present (alarms & Automatic extinguishing systems)	Yes, 81 %	No, 11 %	Yes, 41 % and 29 %**
	Number of floors	Yes, 67 %	Yes, 44 %	No, 30 %
	Construction type (e.g. reinforced concrete, steel)	Yes, 70 %	No, 0 %	No, 15 %
Fire characteristics	Construction characteristics (e.g. façade, claddings)	Yes, 41 %	No, 0 %	No
	Fire cause	Yes, 96 %	Yes, 78 %	Yes, 56 %
	Room of origin	Yes, 74 %	Yes, 89 %	No, 33 %
	Source of ignition	Yes, 74 %	Yes, 67 %	No, 33 %
	Item first ignited	No, 30 %	Yes, 67 %	No, 27 %
	Material mainly responsible for fire development	Yes, 41 %	Yes, 44 %	No, 19 %
Consequences	Size of smoke spread	No, 15 %	Yes, 44 %	No
	Effectiveness of fire safety measures in reducing the fire	Yes, 78 %	No, 11 %	No, 22 %
	Quantification of property damage	Yes, 59 %	No, 11 %	No, 19 %
	Reason for failure of fire safety measures	Yes, 56 %	No, 0 %	No
	Type of property damage	Yes, 56 %	No, 11 %	No, 15 %
	Direct fire costs	Yes, 52 %	No, 0 %	No, 33 %
	Fire spread at final situation	No, 30 %	Yes, 67 %	No
Intervention characteristics	Fire spread at fire brigade arrival	No, 19 %	Yes, 44 %	No, 15 %
	Incident location	Yes, 70 %	No, 33 %	Yes, 56 %
	Incident date	Yes, 52 %	Yes, 56 %	Yes, 85 % (*) and 78 %***
	Incident time	Yes, 52 %	No, 33 %	Yes, 59 %
	Fire detection time	Yes, 52 %	No, 11 %	No
	Fire brigade response time	Yes, 56 %	No, 11 %	No, 33 %
	Time between fire brigade arrival and withdrawal	No, 7 %	No, 0 %	Yes, 67 %(*)
Operation of fire safety measures	Yes, 44 %	No, 0 %	No, 33%	

Note: Green = selected by 50 % or more, orange = selected by 40-49 %, red = selected by less than 40 %.

\* 93 % number of fatalities, and 52 % number of injuries.

\*\* 41 % smoke alarm system, and 29 % fire extinguishing system.

\*\*\* 85 % day, and 78 % month

(\*) data extracted from Task 0

## 8.2. STRENGTHS AND LIMITATIONS

Previous sections described in detail the decisions taken during the research with regard to the collection and interpretation of the data. The section below describes which strengths and limitations these choices resulted in.

- We received input from all 27 EU countries and several non-EU countries. Our goal was that from the three types of organizations<sup>6</sup> at least one respondent per country would complete the questionnaire (i.e. at least four respondents per country). This goal has been largely achieved.
- Since we have 65 respondents from all 27 EU countries, it is assumed that the results are representative for the EU. In countries with several respondents and with differences in answers, the answers were aggregated to identify contradictions from the data.
- From some countries, up to 9 respondents completed the questionnaire. In order to ensure that the results of the countries with several respondents do not count disproportionately, the data has been aggregated. The responses therefore represent an average response per type of organisation, or per country, which does not automatically reflect a response comparable to a country for which 1 response was received.
- Although the distribution of the respondents across the three types of organizations / categories was not equal, the most important respondents, namely the representatives from the regulators and the national fire services, were well represented when looking at the proportion of the total number of respondents.
- For a number of questions, the respondents from the different organization were unanimous in their answer (Q1, Q5, Q6, Q7), and with other questions somewhat divided (Q2, Q3, Q4, Q8, Q9). The choice was made for the total picture of the stakeholders, which means that the choices made by the 'other types of organisations' have less weight as the emphasis of our research is on the opinion of regulators and policymakers.
- It is important to collect relevant and important variables rather than a multitude of variables that are less relevant to policy and legislation. Therefore the choice has been made to only include those in the proposal that were in the majority, with the limit set at 40 % and more.
- For questions 4, 5, 6, 7 and 8, the respondent could indicate an order of priority. For these questions with variables under must, should and could, it was decided to only include those indicated as a "must" in the proposal. The variables mentioned in this top 5 were looked at and not the prioritization (which variable was ranked 1 to 5). Based on the top 5, the most frequently mentioned variables were subsequently identified.
- The system applied in the justification was used to arrive at a balanced judgment and to reduce the number of variables to the most important variables that should be collected.

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<sup>6</sup> Authorities (such as the Ministry of Interior), National fire services and Others (including national statistics institutes, insurance companies, research bodies and fire (prevention) and fire service associations).

## 9. PROPOSAL FOR HARMONIZED DATA COLLECTION

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This proposal gives an answer to the research question of task 2 by describing which fire data would need to be collected in all EU Member States to provide meaningful datasets for allowing legislative and other policy decisions on fire safety at member States and EU level. The method used for the formulation of the proposal can be found in Section 5. This proposal was drawn up in accordance with the selection criteria described therein.

### 9.1. PROPOSED SCOPE OF THE HARMONIZED DATA COLLECTION

Regarding the scope of the dataset, the results reveal that *all types of buildings* must be included in the harmonized data collection. Both the majority of the stakeholders and the consortium partners indicated that need. The preference is also confirmed by the finding that the majority of the EU Member States that already collect data on all types of building fires.

### 9.2. OBJECTIVES AND FIELDS OF INTEREST TO BE COVERED BY THE HARMONIZED DATA COLLECTION

There are several objectives indicated for harmonized fire statistics. Both the stakeholders and the consortium indicated that the ultimate objective is to collect data for:

- research purposes,
- supporting the management of fire service organisations, and
- formulation/implementation and evaluation of policy and legislation.

This indicates that the variables for data collection should be suitable for scientific, policy and performance-oriented application. It also implies that the variables should be focused on issues that support these objectives.

Furthermore, the stakeholders consider it important that the variables are suitable for data collection for:

- identifying fire risks of products, phenomena or events,
- supporting the education of, and information for, citizens, and,
- cost-benefit analysis of fire safety measurements and activities.

In relation to supporting the education of, and information for, citizens it is worth mentioning that some already existing campaigns are operational and that a significant part of the stakeholders indicated that public campaigns in their country are currently based on fire statistics. Also the current funding, capacity and equipping of fire service is already based on statistics. This is interesting to note in relation to the objective of supporting the management of fire service organizations. Other relevant supporting findings can be found in text box 9.1 and text box 9.2.

#### Textbox 9.1. Illustrations from the literature

Related to the **management and performance of fire service organizations**, a study on rescues by the fire brigade during residential fires (Kobes & Van den Dikkenberg, 2016) illustrates how statistics were used to underpin the positive effects of fire rescues, even if these are dangerous actions for firefighters. The statistical data shows that victims are frequently rescued from burning residencies, even from the fire room. Another study that illustrates the importance of collecting data on the management and performance of fire service operations is a study about incidents involving large-scale operation of the fire service. In this study information about duration of the incident (the time between arrival and withdrawal) and several other aspects of fire service operation were collected (Fire Service Academy, 2019). First of all, the study reveals that large scale operations are much more common than expected. Secondly, the incident features also appear to be different from those applied in training situation in preparation for large scale incidents. Based on this information, various incident scenarios have been recorded that provide valuable insights into the development and course of such incidents. The statistical data has provided input for the training of firefighters and for the organization of sufficient capacity for large-scale fire service operations. Variables that support the management of fire service organisations are basically the fire intervention characteristics, such as the 'fire brigade response time' and the 'time between fire brigade arrival and withdrawal'. Variables that are related to the performance of fire service organizations are, for example, the 'fire spread at final situation' compared to the 'fire spread at the arrival of the fire brigade' and the number of rescues victims.



## Textbox 9.2. Illustrations from the literature

The importance of data collection for the **formulation/implementation and evaluation of policy and legislation** can be illustrated by a study of the effects of fire-safe cigarettes (e.g., ‘lower ignition propensity (LIP) cigarette’) on fire safety in people’s living environment was done to obtain an understanding as to what extent those cigarettes contribute to reducing the number of smoke related deaths. The study revealed that the introduction of the fire-safe cigarettes plays a limited role in reducing the number of smoking-related deaths. There are several factors that influence the number of smoking-related deaths. The fire-safe cigarettes focus on the source of ignition (which in an important variable according to both partners and stakeholders, however not included in this section) but there are several other factors in the post-ignition phase related to the object of origin and human characteristics (Fire Service Academy, 2017a).

The objective **‘identifying fire risks of product, phenomena or events’** is closely related to fire characteristics such as: ‘material mainly responsible for fire development’, ‘size of smoke spread’ and ‘item first ignited’. For example, the risk factor smoking and the fire risk of cigarettes is mentioned in literature. Here it was found that a quarter of all fatal fires was caused by smoking, while only 5 % of all fires was caused by smoking (Fire service Academy, 2018). Other studies stress the importance of identifying the fire risks of a product, in this case a sofa. During extensive experiments, a sofa was set to fire. In all the tests, smoke propagated outside the fire room through several routes. This involved both horizontal and vertical smoke propagation to different rooms in the residential building. The results showed that if only part of a sofa was burning in one room, high-risk situations could occur in several locations in the residential building (Fire Service Academy, 2020a; Fire Service Academy, 2020b). These findings from the literature also support the importance of data collection on several variables related to fire characteristics, of which the size of smoke spread in an important one considered in the same study. Smoke propagation in a residential building rapidly decreases the possibility of escape and survivability of the occupants. A fatal situation arises in the fire room within 4 to 7 minutes (Fire Service Academy, 2020b). Data about the size of smoke spread is important when it comes to understanding this unpredictable phenomenon, taking measures for risk management, and decision making on fire safety.

In relation to the objective of **‘supporting the education of and information for citizens’**, it worth mentioning that some already existing campaigns are operational and that 25 % of the stakeholders indicated that public campaigns in their country were currently based on fire statistics. In Europe, initiatives and campaigns have been set up, for example the European fire safety week, to support the education and information of citizens regarding fire prevention and fire safety behaviour of different target groups, for example the elderly (Netwerk Nationale Brandpreventieweken, 2020; Scottish Fire and Rescue Service, 2020). Findings from literature also support the importance of educating and informing citizens to promote fire safety behaviour. For example, in a study on residential fire fatalities and in field experiments conducted with open and closed inner doors, the results showed that opening or closing a door of the fire room as a result of escaping can play in important role in smoke propagation (throughout the building) and survivability (Fire Service Academy, 2018; Fire Service Academy 2020b).

The proposed fields of interest that need to be covered by the data collection are:

- protective measures in buildings, and
- the performance of fire service operations.

Both the majority of the stakeholders and the consortium consider these two fields of interest important. The stakeholders also indicated that the data collection should cover health aspects, the fire safety behaviour of occupants / residents, and economic aspects. When an area of interest is considered of great importance, it implies that the related variables must be included in the data set. The value of collecting data on the performance of fire service operations and the related variables has already been illustrated in text box 9.1. The supporting findings from the literature on protective measures in buildings are included in text box 9.3.

### Textbox 9.3. Illustrations from literature

Data on **protective measures in buildings** includes, among others, the variables 'fire safety measures present' and 'effectiveness of fire safety measures in reducing the fire'. The importance of giving an insight into the protective measures in buildings can be illustrated by findings from field experiments into the effectiveness of various fire safety measures (Exova Warrington Fire Gent NV & Universiteit Gent, 2016). One of the main conclusions from these tests was that only the combination of smoke control and a sprinkler ensured good visibility in the fire room, but that was only after the sprinkler had been activated. In this case, the effectiveness of the fire safety measure contributes to having good visibility in the fire room. A recent study shows that a mobile water mist installation is an effective measure for improving the possibility of escape and the survivability (of some groups): if the door of the fire room is opened by escaping residents compared to the situation without this installation, then only closing the door of the fire room in combination with the water mist installation will improve the situation for all groups (Fire Service Academy, 2020a). On the other hand, there are also examples of protective measures with limited effectiveness, such as smoke detectors in dwellings (Kobes, Groenewegen & Dangermond, 2016; Fire Service Academy, 2017b). It appears that smoke detectors are not always sufficiently effective for elderly residents, since some elderly are still involved in fatal residential fires, even though the smoke detector worked at the time of the incident. Elderly people in particular have difficulty hearing the sound signal while asleep due to the sound frequency used. The same findings apply to some other groups, such as children and people under the influence of alcohol. Furthermore, smoke alarms appear insufficiently effective for persons with mobility disabilities as they cannot respond adequately by escaping quickly. These findings also indicate that the effectiveness of protective measures may be related to the human characteristics and **safety behaviour of occupants/residents**. It shows the importance of studying the effect of fire safety measures based on data and of also considering the human factor.

**Health aspects** relates to data on fire victims, including the type of casualty and the role of a victim. The literature emphasises the importance of making a distinction between occupants / residents and firefighters involved. This distinction is important when collecting data about casualties and victims. In Europe and outside Europe research has been done and data collected about firefighter fatalities as well as civilian fatalities (NFPA, 2020). Another important aspect related to the variable role is data collection on near misses; building fires that did not cause harm, but had the potential to cause injury or ill health (International Association of Fire Chiefs, 2009; Health and Safety Executive, N.D.).

**Economic aspects** include variables relating to property damage and fire costs. In relation to the economic aspects, it is worth noting that about half of the building fires with property damage are residential fires, and are related to 15 % of property damage from indoor fires, while about 10 % are industrial fires and related to 50 % of property damage from indoor fires (Stichting Salvage, 2019; CBS, 2011). This indicates that the importance of economic aspects strongly relates to specific building types.

### 9.3. PROPOSED DATA NEEDED FOR DECISION-MAKING

The data needed for decision-making is based on three sets of findings, these being the variables selected by the majority of the stakeholders, the variables selected by the majority of the consortium partners, and the variables already collected by the majority of the EU Member States. The following Venn diagram shows (figure 9.1) the relationship between the three different sets of findings and how they overlap.

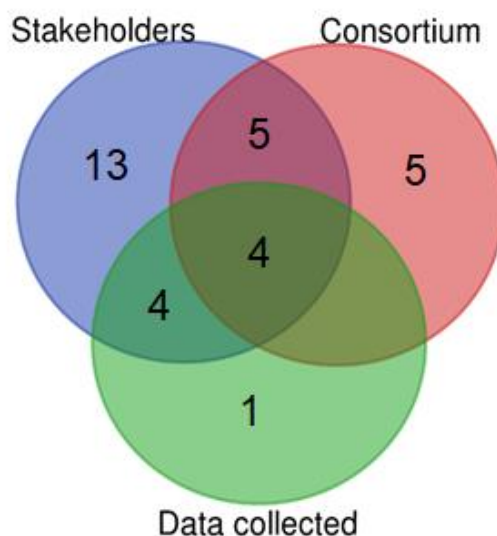


Figure 9.1 Data confirmed by stakeholders, the consortium, and data collected by EU-27

Table 9.1 Variables per section of the Venn diagram

Tier	Section	Total	Variables
1	Intersection of Consortium & Data collected & Stakeholders	4	Number of victims; Age, Fire cause; Incident date.
1	Intersection of Data collected & Stakeholders	4	Type of building; Incident time; Incident location; Type of casualty;
2	Intersection of Consortium & Stakeholders	5	Material mainly responsible for fire development; Source of ignition; Number of floors; Room of origin; Fire safety measures present
3	Stakeholders, excluding the intersection with other sets	13	Operation of fire safety measures; Reason for failure of fire safety measures; Construction characteristics; Number of occupants in the building; Quantification of property damage; Fire detection time; Disability; Role; Fire brigade response time; Construction type; Effectiveness of fire safety measures in reducing the fire; Direct fire costs; Type of property damage.
3	Consortium, excluding the intersection with other sets	5	Fire spread at final situation; Fire spread at fire brigade arrival; Item first ignited; Size of smoke spread; Gender;
3	Data collected, excluding the	1	Time between fire brigade arrival and withdrawal.

	intersection with other sets		
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We divided the selected variables into three tiers. Tier 1 includes the variables that were already being collected by the majority of the EU Member States and are also covered by the sets of variables selected by the majority of the stakeholders and the consortium (4 variables), or that are also covered by the set of the stakeholders only (4 variables). The variables in tier 2 are considered important by both the stakeholders and the consortium.

*Tier 1 – Eight variables; covered by all three sets, or only by the stakeholders and existing data collection*

Variables in tier 1 are considered essential for data collection, those include:

- Number of victims
- Age of victims
- Type of casualty
- Type of building
- Fire cause
- Incident date
- Incident time
- Incident location

The most frequently selected variables regarding human characteristics are the ‘number of victims’ and the ‘type of casualty’. Currently, the majority of EU Member States already collect data about the ‘number of fatalities’ and the ‘number of injuries’. This leads to two variables: **number of fatalities** and **number of injuries**. These variables are important to distinguish between, for example, fatal fires and non-fatal fires. A research study into fatal residential fires in Europe (Fire Service Academy, 2018) reveals that several fire risks can be identified by comparing the characteristics of fatal fires to those of non-fatal fires. Having an insight into the fire risks is important for evaluating existing policy and determining the focus of citizens’ education and information on fire safety.

Data about the **age of victims** is collected by the majority of the EU Member States (52 %). The choice is supported by the stakeholders and the consortium, and by findings from the literature. Indeed, it was found in a research study into fatal residential fires in Europe (Fire Service Academy, 2018) that age is relevant to collect in several countries. For example, in the Netherlands and in the USA, elderly (age 61 and older or in some literature 65 and older) are over represented among victims of fatal residential fires, and that they are a risk group for serious injuries from fire (NFPA, 2019; Fire Service Academy, 2020c). When studying this specific risk group, it appears that the physical and cognitive limitations are to a large extent responsible for the fact that the elderly are over represented in fire statistics. They appear to have a greater risk of dying in a residential fire. Another study about the (potential) fire risks for different groups stresses the importance of taking age into account (Fire Service Academy, 2020c). Here the results show that there are differences among age groups related to the risk of fire and fire causes for residential fires in the Netherlands.

The variable **type of building** is frequently mentioned by the stakeholders and is currently already being collected by the majority of the EU Member States. As the proposed focus is on all types of buildings (e.g. Residential, non-residential, etc.), it is essential to collect data on the type of building so as to ensure that a distinction can be made between the fire risk of different types of buildings. This distinction is important as, for example, most of the fire-related fatalities are in dwelling fires (UK Home Office, 2019).

Both the stakeholders and the consortium indicated the ‘**fire cause**’ as an important variable regarding fire characteristics. Examples of values for this variable are *human act, equipment failure, natural phenomenon, etc.* Additionally, this variable is already being collected by the majority of the EU Member States.

The variables regarding fire intervention characteristics which are frequently mentioned by the stakeholders and which are also currently already being collected by the majority of the EU Member States include ‘**incident location**’, ‘**incident date**’ and ‘**incident time**’. Examples of values for the variable incident location can be geographical coordinates or the building address.

*Tier 2 – five variables; covered by the sets of the stakeholders and the consortium*

We also believe that there are five other variables chosen by the stakeholders as well as the consortium that are not currently collected by the majority of the countries. For these specific five variables, we propose to include them in the list, because they are important but as a Tier 2 priority, one that should be harmonised and implemented in a second step. Those variables are the following:

- Room of origin
- Source of ignition
- Number of floors
- Material mainly responsible for fire development
- Fire safety measures present

**'Room of origin', 'source of ignition'** (also referred to as 'heat source') and **'material mainly responsible for fire development'** are important variables, but such insight can usually only be obtained through a fire investigation at the fire scene. The number of EU countries already collecting data about the source of ignition is currently unknown, but it is confirmed that Sweden, the UK and USA already collect this data field. The implementation of these two variables might be more complex than the others, which is why it is also in the tier 2 list.

Examples of values for the variable 'Room of origin' can be *sleeping area, hallway, kitchen, etc.* Examples of values for the variable 'source of ignition' can be *electric appliance, open flame, etc.* Examples of values for the variable 'material mainly responsible for fire development' can be *upholstered furniture, building insulation, cardboards, curtains, etc.* All these variables and their corresponding values will be defined during Task 4.

Regarding the variable room of origin, it was confirmed that at least 30 % of EU countries collect this data field. With regard to fires in high rise buildings, it is conceivable that the information about the **number of floors** is relevant. Data about the number of floors can give a substantial amount of information about the efficiency of fire safety and any evacuation measures that have been adopted (e.g. the evacuation strategy of a high-rise building is usually different than for single floor buildings). This can also be a strong indicator when comparing data between different countries. However, the consortium's experience in collecting data reveals that collecting data about the number of floors does not deliver the desired quality of data, resulting in limited reliability of the data. The data field is not always answered correctly or filled in at all and therefore the problem of missing data arises (along with reduction of statistical power and representativeness).

*Tier 3 - Variables covered by one set*

Other variables are only covered by the set of the stakeholders (13), the consortium (5), or existing data collection (1). Those variables are not included in this proposal, though they may be of interest for the further development of data collection. The variables are listed below in order of the number of countries that selected the variable concerned or in which information is already being collected.

- Construction type
- Item first ignited
- Fire spread at final situation
- Time between fire brigade arrival and withdrawal
- Quantification of property damage
- Gender of victim
- Reason for failure of fire safety measures
- Fire brigade response time
- Type of property damage
- Number of occupants in the building
- Fire detection time
- Direct fire costs
- Disability of victim
- Role of victim (e.g. firefighter or citizen)
- Operation of fire safety measure
- Fire spread at fire brigade arrival
- Size of smoke spread
- Construction characteristics

## **9.4. CONCLUSION**

From the results of the questionnaire distributed to the stakeholders of the EU member states, we propose to choose 13 variables as a basis to the harmonized European fire statistics. The choice is mainly based on the opinions of the majority of the stakeholders from the EU Member States who responded to the questionnaire, with the observation that the variable was already being collected by the majority of the EU Member States and/or the confirmation by the opinion of the majority of the consortium. As a starting point, the following eight variables should be collected.

### **Tier 1:**

1. Number of fatalities
2. Number of injuries
3. Age of fatalities
4. Fire cause
5. Type of building
6. Incident location
7. Incident date
8. Incident time

Once the previous eight variables have been implemented efficiently, we propose adding the second tier, which would include five additional variables:

### **Tier 2:**

9. Number of floors
10. Room of origin
11. Source of ignition (or heat source)
12. Material mainly responsible for fire development
13. Fire safety measures present

Collecting these variables as part of the harmonized European fire statistics should not prevent the European countries to continue collecting other variables in parallel.

## 10. REFERENCES

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## ANNEX I - QUESTIONNAIRE

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### Introduction

Welcome and thank you for agreeing to fill in this questionnaire.

Please read the following information carefully before proceeding.

**Objective:** The project *EU FireStat* aims at mapping the existing data on fire safety at EU Member States and at EU level. It further aims at developing a proposal on how the potential lack of common data could be solved to provide meaningful data sets to allow for informed policy making at the EU and/or Member State levels. This questionnaire is developed to assess the needs and views of the EU Member States on the collection of fire statistics. We are especially interested in needs and views on fire safety data in the context of policy making in your Member State/country.

**Content and duration of the questionnaire:** We would like to ask you to answer the following several questions regarding the needs of statistical parameters. At the start of the questionnaire, we would also like to ask you to provide some background information in order to help us in the analysis of the responses received. Please keep in mind that the scope of the questions regards all types of building fires. There are nine questions and completing the questionnaire will take approximately 15-20 minutes. Please note that we highly recommend using a PC/laptop (no mobile phone or tablet).

**Confidentiality of your data:** All of your answers will be kept strictly confidential and your participation in this survey is voluntary. Even after starting the study, you are free to stop at any time and for any reason. You are also allowed to go back to previously given answers and revise them. We would like to welcome you to forward the questionnaire as you see relevant.

Thank you in advance for your time and participation.

**Users profile**

On behalf of **which country** are you filling in this questionnaire?

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**Which organisation** do you represent?

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What is **your function** at this organisation?

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Would you be willing to be contacted by the project team for possible follow-up questions? If so, you are kindly asked to fill in your contact details below.

Name \_\_\_\_\_

Email address \_\_\_\_\_

**Policy and fields of interest**

We would like to ask you about possible limitations in the scope of statistics collection that could make it more efficient and reducing the burden of collecting fire statistics.

**Q1. In practice, what types of buildings should be included in a harmonized data collection?**

- All types of buildings
- Residential
- Health care
- Accommodation
- Leisure
- Meeting
- Industrial
- (Animal) farming
- Office
- Shop
- Sport
- Educational
- Detention building
- Other, namely \_\_\_\_\_



**Q2. In your opinion, what should be the ultimate objective of harmonised European fire statistics?**

Please select the 4 (or less) options you feel are the most important.

- Formulation/implementation of policy
- Evaluation of existing policy
- Formulation/implementation of legislation
- Evaluation of existing legislation
- Supporting the education of and information for citizens
- Supporting the management of fire service organisations
- Identifying fire risks of products, phenomena or events
- Research
- Cost-benefit analysis of fire safety measurements and activities
- Other, namely \_\_\_\_\_

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You have selected the option 'formulation/implementation of policy'. Should the harmonised European fire statistics preferably support the formulation/implementation of policy at national or EU level?

- At EU level
- At national level
- At EU and national levels

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You have selected the option 'evaluation of existing policy'. Should the harmonised European fire statistics preferably support the evaluation of existing policy at national or EU level?

- At EU level
- At national level
- At EU and national levels

You have selected the option 'formulation/implementation of legislation'. Should the harmonised European fire statistics preferably support the formulation/implementation of legislation at national or EU level?

- At EU level
  - At national level
  - At EU and national levels
- 

You have selected the option 'evaluation of existing legislation'. Should the harmonised European fire statistics preferably support the evaluation of existing legislation at national or EU level?

- At EU level
- At national level
- At EU and national levels

**Using statistics for policy making**

**In your country, are fire statistics used for policy decisions on fire safety?**

- Yes, systematically
- Yes, sometimes on "ad hoc" basis
- No
- I don't know

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(If the answer is yes)  
Please explain how statistics are used. Could you give an example of policymaking or a decision based on fire statistics from your country?

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(If the answer is no)  
If not upon fire statistics, what are the current policymaking and/or decisions based upon?

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**Data for policy decision making**

**Q4. If we focus only on the consequences of building fires, which parameters below are needed to provide meaningful datasets for allowing legislative and other policy decisions in your country?**

Please drag the parameters (the parameters below) to the field you believe corresponds to its importance by completing the following sentence: "With regards to fire statistics, [parameter] must/should/could be collected".

If you prefer adding one or more parameters not indicated in the list, you may do so by adding them into the parameter "Other, namely".

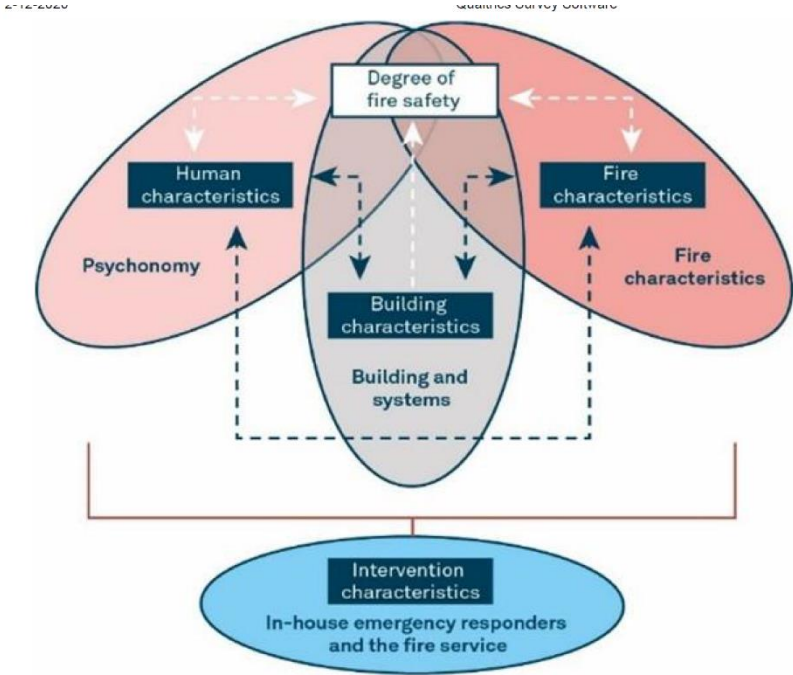
After allocating parameters to their respective fields you can change their order of priority within the field.

- Type of property damage (e.g. flame, heat, smoke and water damage)
- Quantification of property damage (e.g. square meters, percentage)
- Direct fire costs (e.g. property loss, medical care)
- Indirect costs (e.g. temporary shelter, loss of business)
- Type of insurance of losses (e.g. insured or uninsured)
- Cost incurred to insurance companies
- Environmental consequences (e.g. pollution of open water, air pollution, damage to nature reserve)
- Social consequences (e.g. traffic jam, evacuation of local residents, smoke nuisance)
- Effectiveness of fire safety measures in reducing the fire (e.g. alarm system, automatic extinguishing systems)
- Reasons for failure of fire safety measures (e.g. alarm system)
- Fire spread at fire brigade arrival
- Fire spread at final situation
- Other, namely

Must (maximum of 5)	Should (no maximum)	Could (no maximum)

**Introduction on characteristics of fire safety**

The figure below shows a model, based on scientific research, that describes four factors that influence fire safety. These factors are related to human characteristics, building characteristics, fire characteristics and intervention characteristics. The following four questions (Q5-Q8) are based upon this model.





**Q5. Related to *human characteristics*, which parameters are needed to provide meaningful datasets of building fires for allowing legislative and other policy decisions on fire safety in your country?**

Please drag the parameters (the parameters below) to the field you believe corresponds to its importance by completing the following sentence: "With regards to fire statistics, [parameter] must/should/could be collected".

If you prefer adding one or more parameters not indicated in the list, you may do so by adding them into the parameter "Other, namely".

After allocating parameters to their respective fields you can change their order of priority within the field.

- Type of casualty (e.g. fatality or injury)
- Number of victims
- Number of occupants present in the building
- Role (e.g. occupant or firefighter)
- Age
- Gender
- Ethnicity
- Sleep/awake
- Smoker/non-smoker
- Drug or alcohol usage
- Disability
- Profession
- Type of household
- Income category
- Other, namely

Must (maximum of 5)	Should (no maximum)	Could (no maximum)

---

**Q6. Related to *building characteristics***, which parameters are needed to provide meaningful datasets for allowing legislative and other policy decisions on fire safety in your country?

Please drag the parameters (the parameters below) to the field you believe corresponds to its importance by completing the following sentence: "With regards to fire statistics, [parameter] must/should/could be collected".

If you prefer adding one or more parameters not indicated in the list, you may do so by adding them into the parameter "Other, namely".

After allocating parameters to their respective fields you can change their order of priority within the field.

- Type of building (e.g. residential or non-residential)
- Construction type (e.g. reinforced concrete, steel)
- Construction characteristics (e.g. façade, claddings)
- Number of floors
- Building dimension
- Floor measurement (m2)
- Fire safety measures present (e.g. alarm system, compartmentation)
- Position of inner doors (open or closed)
- Ownership situation (rental or private property)
- Year of construction
- Other, namely

Must (maximum of 5)	Should (no maximum)	Could (no maximum)

---

**Q7. Related to fire characteristics**, which parameters are needed to provide meaningful datasets of building fires for allowing legislative and other policy decisions on fire safety in your country?

Please drag the parameters (the parameters below) to the field you believe corresponds to its importance by completing the following sentence: "With regards to fire statistics, [parameter] must/should/could be collected".

If you prefer adding one or more parameters not indicated in the list, you may do so by adding them into the parameter "Other, namely".

After allocating parameters to their respective fields you can change their order of priority within the field.

- Fire cause
- Room of origin
- Source of ignition
- Item first ignited
- Material first ignited
- Material mainly responsible for the fire development
- Speed of fire growth
- Size of fire spread
- Size of smoke spread
- Direction of fire spread (horizontally or vertically)
- Time of day/night
- Date
- Weather
- Other, namely

Must (maximum of 5)	Should (no maximum)	Could (no maximum)

---

**Q8. Related to intervention characteristics, which parameters are needed to provide meaningful datasets of building fires for allowing legislative and other policy decisions on fire safety in your country?**

Please drag the parameters (the parameters below) to the field you believe corresponds to its importance by completing the following sentence: "With regards to fire statistics, [parameter] must/should/could be collected".

If you prefer adding one or more parameters not indicated in the list, you may do so by adding them into the parameter "Other, namely".

After allocating parameters to their respective fields you can change their order of priority within the field.

- Incident date
- Incident time
- Incident location
- Fire detection time
- Occupant response time
- Type of call (fire or false alarm)
- Type of incident (deliberate or accidental)
- Fire brigade on site
- Fire brigade response time (notification, dispatch, preparation, travel time)
- Fire brigade set up time
- Occupant rescue time by fire brigade
- Fire extinguishment time by fire brigade
- Time between incident and casualty
- Time between fire brigade arrival and withdrawal
- Number of attended fire brigade vehicles / firefighters
- Firefighting operations (e.g. offensive attack)
- Operation of fire safety measures (e.g. compartmentation, fire barriers, escape routes)
- Occupant extinguishing action
- Evacuation measures
- Other, namely

Must (maximum of 5)	Should (no maximum)	Could (no maximum)

---

**Q9. Which fields of interest should harmonised European fire statistics cover?**

Please select the 4 (or less) fields you feel are the most important.

- Performance of fire service operations
- Fire safety behaviour of occupants/residents (e.g. smoking in bed)
- Protective fire measures in buildings
- Consumer product safety
- Health aspects (e.g. fatal fires, injuries)
- Economic aspect (e.g. fires with high property loss)
- Impact on society (e.g. large-scale evacuations/electricity failure)
- Environmental aspects (e.g. water runoff, the use of extinguishment foam, release of toxic gases and substances)
- Other, namely \_\_\_\_\_

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**Q10. Do you feel there are any additional statistical parameters that are not covered within the previously mentioned characteristics which are needed for policymaking and/or decisions? If so, what are they?**

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You have reached the end of the questionnaire. Thank you very much for your time and your precious support!

Please be aware that at this stage, you are still able to go back to a previously given answers and revise them. If you proceed, **your answers will be processed.**

To follow the progress of our project, please visit our website: <https://eufirestat-efectis.com>  
If you have additional questions, please reach us at: [EU.FireStat@efectis.com](mailto:EU.FireStat@efectis.com)

## ANNEX II – DETAILED REPORT OF ANALYSIS

### OVERVIEW ANALYSIS - STAKEHOLDERS QUESTIONNAIRE

This section presents the results of the questionnaire. For each question, the results are shown in tables with a description of the analysis.

**Table 0.1 Overview of the responses after aggregation**

	Aggregated frequencies			
	Authorities	National fire services	Other	Total of stakeholders (EU-27)
<i>Countries</i>	15	12	14	27
Austria	0	0	1	1
Belgium	1	1	1	1
Bulgaria	1	0	1	1
Croatia	0	0	1	1
Cyprus	0	1	0	1
Czech Republic	1	1	0	1
Denmark	1	0	0	1
Estonia	0	1	0	1
Finland	1	0	1	1
France	1	0	1	1
Germany	0	1	1	1
Greece	0	0	1	1
Hungary	1	0	0	1
Ireland	1	0	0	1
Italy	0	1	0	1
Latvia	1	0	0	1
Lithuania	0	1	1	1
Luxembourg	1	1	0	1
Malta	1	0	0	1
Netherlands	0	0	1	1
Poland	1	0	1	1
Portugal	0	1	0	1
Romania	1	0	0	1
Slovakia	1	1	0	1
Slovenia	0	0	1	1
Spain	0	1	1	1
Sweden	1	1	1	1

The responses from non-EU Member States are also included in the tables, in column 'Non-EU'. The results reflects the opinions of representatives from Scotland, the UK, Switzerland and New Zealand.

**Question 1. In practice, what types of buildings should be included in a harmonized data collection?**

The first question is about the type of buildings that should be included in data collection. Respondents were asked about possible limitations in the scope of statistics collection that could make it more efficient and reducing the burden of collecting fire statistics. Respondents could select 'all types of buildings' or choose specific buildings listed in the questionnaire. They had the opportunity to add types of buildings not mentioned in the list.

**Table 0.2 Scope of data collection**

	Frequencies				
	Authorities	National fire services	Other	EU-27	Non-EU
<i>Total number of countries / respondents</i>	15	12	14	27	4
All types of buildings	11	10	11	22	4
Industrial	2	2	4	5	0
Residential	2	3	4	5	0
Health care	3	2	2	4	0
Office	2	2	2	4	0
Accommodation	2	2	1	3	0
Detention	2	2	1	3	0
Educational	2	2	2	3	0
Shop	2	2	1	3	0
(Animal) farming	0	2	2	2	0
Leisure	1	1	1	2	0
Meeting	1	2	1	2	0
Sport	1	2	1	2	0

Almost all respondents mentioned that 'all building types<sup>7</sup>' should be included in a harmonized data collection. Other mentioned building types, instead of all building types, are 'residential building', 'industrial building', 'health care building', 'office building', 'accommodation building', 'detention building', 'educational building', 'shop', '(animal) farming building', 'leisure building', 'meeting building' and 'sport building'. There are no significant differences when looking at the answers for the different types of organizations.

The respondents indicated that a distinction should be made between administrative buildings and buildings from the critical infrastructure. Also, high-rise buildings, historical buildings and crowded rooms were mentioned as a standalone category or as characteristics of the listed categories. Other suggested excluding military and or fireworks factories. Two respondents suggested using similar general building types of categories but to use subcategories as well (e.g., residential and subcategories: single house, flat, apartment, etc.) which allows the data to be examined in more detail.

**Question 2. What should be the ultimate objective of harmonized European fire statistics?**

Respondents could select four or less of the nine variables listed in the questionnaire or they could add another variable of their preferences that was not listed. The variables respondents could select were: formulation / implementation of policy or legislation, evaluation of the aforementioned, supporting education and information for citizens, supporting the management of fire service organizations, identifying fire risks of products,

<sup>7</sup> Listed in the questionnaire: residential, health care, accommodation, leisure, meeting, industrial, (animal) farming, office, shop, sport, educational and detection building.



phenomena or events, research, cost-benefit analysis of fire safety measurements and activities. The respondents selected an average of four variables.

**Table 0.3 Ultimate objective**

	Frequencies				
	Authorities	National fire services	Other	EU-27	Non-EU
<i>Total number of countries / respondents</i>	15	12	14	27	4
Identifying fire risks of products phenomena or events	11	7	11	18	4
Research	6	5	9	16	1
Supporting the management of fire service organizations	5	8	6	14	1
Supporting the education of and information for citizens	9	5	6	14	2
Cost-benefit analysis of fire safety measurements and activities	6	7	7	13	2
Formulation/implementation of legislation	6	6	2	12	1
Evaluation of existing legislation	7	5	3	11	2
Formulation/implementation of policy	5	4	4	10	1
Evaluation of existing policy	3	4	6	9	2
Analysis of statistics	0	0	0	0	0

The majority of the respondents indicated that 'identifying fire risks of products, phenomena or events' should be the ultimate objective of harmonized European fire statistics. All the other variables included in the questionnaire were frequently indicated as important objectives, varying from one third to half of the respondents per objective. The required level was reached for the variables on formulating and evaluating policy and legislation (although they are mentioned least often). More than a half of the respondents who assigned the formulation and/or evaluation of policy as an ultimate objective of harmonized European fire statistics indicated that it should preferably support the formulation at both EU and national levels. One third preferred the support by statistics at only the national level and a few preferred it only at the EU level. The formulation and evaluation of legislation should, in the opinion of almost all respondents, preferably be supported by statistics at both the EU and national levels.

Per type of organization there was a difference in the preferences. The respondents from authorities indicated that 'identifying fire risks of products, phenomena or events', 'supporting the education of and information for citizens' and 'Evaluation of existing legislation' were the most important objectives of harmonized European fire statistics. For the national fire services, the first mentioned objective is important as well as 'supporting the management of fire service organizations' and 'cost-benefit analysis of fire safety measurements and activities'. The majority of the 'other' type of organizations indicated that 'research' is important, besides the most selected objective: 'identifying fire risk of products phenomena or events'. One respondent supplemented the given list with 'analysis of statistics' as one of the ultimate objectives.

**Question 3. In your country, are fire statistics used for policy decisions on fire safety?**

Question 3 is about the use of statistics for policy decision making. The results of this question are, in contrast to the other results, analyzed at a country level and aggregation has also been applied here<sup>8</sup>. Therefore the results of individual countries can be described.

<sup>8</sup> Multiple responses from an organization type are aggregated per country. For several respondents from an organization type in a country the answer 'I don't know' was ignored if others answered differently. Otherwise, the most chosen answer was selected (and accepted as 'truth'). When different answers were given and the distribution was equal (for example: one response 'no', one 'yes, systematically' and one 'yes, sometimes on "ad hoc" basis') then 'yes, sometimes on "ad hoc" basis' was chosen for analysis. This combination of answers occurred several times.

**Table 0.4 Use of fire statistics**

	Frequencies	
	EU-27	Non-EU
<i>Total number of countries / respondents</i>	27	4
Yes, systematically	4	1
No	2	0
I don't know	1	0
Yes, sometimes on "ad hoc" basis	26	3

In almost all countries fire statistics are used for policy decisions on fire safety, mostly on an “ad hoc” basis. Several respondents gave examples of how the statistics are used. For half of the countries, it was mentioned that the current legislation is based on statistics. According to the respondents, this applies to Belgium, Bulgaria, Denmark, Finland, France, Germany, Ireland, Italy, Lithuania, Luxembourg, the Netherlands, New Zealand, Poland, Slovakia and Sweden. For a quarter of the countries, it was mentioned that public campaigns are based on statistics and in nearly a quarter of the countries the funding, capacity and equipping is based on statistics.

Some respondents indicated that the current (national) policymaking and/or decisions was not based upon fire statistics, but on EU Standards and British Standards, on common knowledge, or on the knowledge of several experts, on major events and their consequences, or on lobbying of certain groups.

For question 4 to 8 respondents were asked to indicate which variables they considered important for allowing legislative and other policy decisions in their country. The variables were questioned per category from the safety model, namely for the consequences of fire and for the human, fire and building characteristics. Furthermore, a distinction was made between variables that *must*, *should* or *could* be included in a harmonized data collection. Per category, the variables are first listed that the respondents mentioned in their top 5 of most important variables (must). The respondents selected an average of four (q4 and q6) or five (q5, q7 and q8) variables. Finally, the variables assigned to could and should are mentioned.

**Question 4. *If we focus only on the consequences of building fires, which variables are needed to provide meaningful datasets for allowing legislative and other policy decisions in your country?***

Question 4 focuses on the variable(s) that must / should / could be collected with regards to the consequences of building fires. Respondents could assign twelve different variables for this question of which a top 5 for must and an unlimited number of variables for should / could.

**Table 0.5 Variables that are assigned to the top 5 of most important variables (category 'must')**

	Frequencies				
	Authorities	National fire services	Other	EU-27	Non-EU
<i>Total number of countries / respondents</i>	15	12	14	27	4
Effectiveness of fire safety measures in reducing the fire	10	9	11	21	2
Quantification of property damage	8	7	8	16	2
Reason for failure of fire safety measures	8	4	9	15	3
Type of property damage	8	6	7	15	1
Direct fire costs	7	7	8	14	3
Environmental consequences	4	6	6	10	0
Fire spread at final situation	6	4	4	8	3
Fire spread at fire brigade arrival	4	4	5	5	1
Type of insurance of losses	1	2	1	3	0
Indirect costs	2	0	1	2	0
Cost incurred to insurance companies	1	0	1	2	1
Social consequences	1	2	1	2	0

Over three quarters of the respondents indicated that the variable 'effectiveness of fire safety measures in reducing the fire' must be included in a harmonized data collection. More than half of the respondents indicated that 'quantification of property damage', 'reason for failure of fire safety measures' and 'type of property damage' must be included. 'Direct fire costs' was mentioned by about half of the respondents.

Among all organization types, 'effectiveness of fire safety measurements in reducing the fire' was mentioned as a must. 'Reason for failure of fire safety measures' was mentioned by more than half of the respondents from the authorities and 'other' types of organizations, however this variable was only selected by a third of the national fire services. 'Direct fire costs' was mentioned by slightly less than half of the respondents from the authorities, compared to the national fire services and 'other', respondents of these organization types selected this variable in more than half of the cases. Furthermore, there are no other notable differences or striking results when looking at the answers given by the different types of organizations.

Variables that are assigned to the category 'should be included in a harmonized data collection'.

**Table 0.6 Variables that are assigned to the category 'should be included in a harmonized data collection'**

	Frequencies		
	Authorities	National fire services	Other
<i>Total number of respondents</i>	15	12	14
Fire spread at fire brigade arrival	9	5	6
Reasons for failure of fire safety measures (e.g. alarm system)	5	6	7
Social consequences (e.g. traffic jam, evacuation of local residents, smoke nuisance)	5	7	6
Fire spread at final situation	7	4	6
Quantification of property damage (e.g. square meters, percentage)	5	3	5
Direct fire costs (e.g. property loss, medical care)	4	2	6
Environmental consequences (e.g. pollution of open water, air pollution, damage to nature reserve)	3	5	4
Indirect costs (e.g. temporary shelter, loss of business)	4	3	5
Type of property damage (e.g. flame, heat, smoke and water damage)	5	2	5
Effectiveness of fire safety measures in reducing the fire (e.g. alarm system, automatic extinguishing systems)	5	2	2
Type of insurance of losses (e.g. insured or uninsured)	2	3	4
Cost incurred to insurance companies	2	1	5
Other, namely	1	0	0

Almost half of the respondents mentioned that 'fire spread at fire brigade arrival' should be included in a harmonized data collection. Less than half of the respondents indicated that 'reason for failure of fire safety measures', 'social consequences' and 'fire spread at final situation' should be included.

There are no other notable differences or striking results when looking at the answers given by the different types of organizations.

**Table 0.7 Variables that are assigned to the category ‘could be included in a harmonized data collection’**

	Frequencies		
	Authorities	National fire services	Other
<i>Total number of respondents</i>	15	12	14
Cost incurred to insurance companies	8	8	6
Type of insurance of losses (e.g. insured or uninsured)	8	4	8
Indirect costs (e.g. temporary shelter, loss of business)	6	7	6
Social consequences (e.g. traffic jam, evacuation of local residents, smoke nuisance)	7	2	6
Environmental consequences (e.g. pollution of open water, air pollution, damage to nature reserve)	5	2	2
Type of property damage (e.g. flame, heat, smoke and water damage)	1	4	2
Direct fire costs (e.g. property loss, medical care)	2	3	1
Fire spread at fire brigade arrival	0	2	3
Quantification of property damage (e.g. square meters, percentage)	2	1	2
Fire spread at final situation	1	0	2
Reasons for failure of fire safety measures (e.g. alarm system)	1	2	0
Effectiveness of fire safety measures in reducing the fire (e.g. alarm system, automatic extinguishing systems)	0	1	0

Over a half of the respondents indicated that ‘cost incurred to insurance companies’ could be included in a harmonized data collection. ‘type of insurance of losses’ and ‘indirect costs’ are also mentioned by slightly less than half of the respondents. Over a third of the respondents mentioned ‘social consequences’.

On organization level, ‘type of insurance of losses’ and ‘social consequences’ were mentioned often by authorities and ‘other’ types of organizations. When the results are compared with the variables often selected by respondents from the national fire services, it appears that those variables are mentioned less often by them. However, ‘indirect costs’ are often selected by the three types of organizations.

Based on the fire safety model (see also section 2.1), four factors are part of the following question 5 to 8.

**Question 5. Related to human characteristics, which variables are needed to provide meaningful datasets of building fires for allowing legislative and other policy decisions on fire safety in your country?**

Question 5 focuses on the variable(s) that must / should / could be collected with regards to human characteristics related to building fires. Respondents could assign fourteen different variables for this question of which a top 5 for must and an unlimited number of variables for should / could. Respondents could also add one or more variables not indicated in the list by describing them into ‘other, namely’. Respondents used this option for this question and the results for ‘must’ are also presented in this section.

**Table 0.8 Variables that are assigned to the top 5 of most important variables (category ‘must’)**

	Frequencies				
	Authorities	National fire services	Other	EU-27	Non-EU
<i>Total number of countries / respondents</i>	15	12	14	27	4
Type of casualty	14	11	14	25	4
Number of victims	14	9	14	24	4
Number of occupants in the building	5	7	6	14	1
Age	8	4	7	13	1
Disability	6	6	5	13	1
Role	7	6	5	13	3
Type of household	4	4	5	8	1
Gender	5	2	1	5	1
Sleep / awake	4	3	3	5	0
Smoker / non-smoker	2	1	1	4	1
Drug or alcohol usage	1	1	1	2	1
Income category	0	0	1	1	0
Ethnicity	0	0	0	0	0
Profession	0	0	0	0	0

Almost all respondents indicated that ‘type of casualty’ and ‘number of victims’ must be included in a harmonized data collection. ‘Number of occupants present in de the building’, ‘role’, ‘age’ and ‘disability’ were mentioned by less than half of the respondents. The variables ethnicity and profession were not mentioned by the respondents.

Age was mentioned by (more than) half of two types of organizations: authorities and other; less than half of the respondents from the national fire services mentioned this variable.

**Additional information on the data that must be collected on human characteristics**

In addition to the variables listed in the questionnaire, respondents were also asked to describe any other variables that they considered must be collected. Some respondents indicated that in addition to ‘type of casualty’, there must be a distinction between deaths / fatal injury or injury (as to direct consequence of the fire). Other mentioned classification of casualties by severity and information about the nature and extent of casualty injuries, as well as the root cause (indirect cause) of fire deaths. One respondent stated that the location of the casualties must be included. A distinction between firefighter casualty and occupant casualty was mentioned, as well as the action that led to the injury (e.g. Firefighting or attempting to rescue or escape, etc.).

Concerning occupant behaviour and presence, the following was mentioned that must be collected:

- > Number to self-evacuate
- > Occupant behaviour during the incident
- > Usual occupants or visitors
- > Cognitive and mental capacity

**Table 0.9 Variables that are assigned to the category ‘should be included in a harmonized data collection’**

	Frequencies		
	Authorities	National fire services	Other
<i>Total number of respondents</i>	15	12	14
Drug or alcohol usage	8	8	7
Smoker/non-smoker	7	7	8
Sleep/awake	8	5	7
Disability	7	6	6
Number of occupants present in the building	8	6	3
Role (e.g. occupant or firefighter)	5	5	7
Age	4	5	7
Gender	5	2	9
Type of household	5	5	3
Ethnicity	4	1	6
Income category	3	3	5
Profession	2	2	1
Number of victims	0	2	0
Type of casualty (e.g. fatality or injury)	0	2	0
Other, namely	1	0	1

‘Drug or alcohol usage’, smoker/non-smoker’ and ‘sleep / awake’ was mentioned by (more than) half of all respondents as variables that could be included in harmonized data collection, followed by ‘disability, which was selected by almost half of the respondents.

‘Sleep/awake’ was mentioned by (more than) half of the respondents of the authorities and ‘other’, however this variables was mentioned by less than half of the respondents of the national fire services. When comparing the results for the three types of organizations, ‘number of occupants present in the building’ was mentioned less often by the organization category ‘other’.

**Table 0.10 Variables that are assigned to the category ‘could be included in a harmonized data collection’**

	Frequencies		
	Authorities	National fire services	Other
<i>Total number of respondents</i>	15	12	14
Profession	7	7	10
Ethnicity	5	9	5
Income category	7	5	5
Gender	3	6	4
Drug or alcohol usage	5	2	5
Smoker/non-smoker	5	1	4
Type of household	4	1	5
Age	2	1	2
Number of occupants present in the building	1	1	3
Role (e.g. occupant or firefighter)	2	1	2
Sleep/awake	0	1	4
Disability	0	1	1
Number of victims	1	0	0
Type of casualty (e.g. fatality or injury)	1	0	0
Other, namely	0	1	0

More than half of the respondents mentioned the variable ‘profession’ could be included in harmonized data collection. ‘Ethnicity’ was mentioned by slightly less than half of the respondents, followed by ‘income category’.

‘Ethnicity’ was mentioned by more than half of the respondents of the national fire services, however it was mentioned by less than half of the other two organizations types.

**Question 6. Related to *building characteristics*, which variables are needed to provide meaningful datasets for allowing legislative and other policy decisions on fire safety in your country?**

Question 6 focuses on the variable(s) that must / should / could be collected with regards to building characteristics related to building fires. Respondents could assign ten different variables for this question of which a top 5 for must and an unlimited number of variables for should / could. Respondents could also add one or more variables not indicated in the list by describing them into ‘other, namely’. Respondents used this option for this question and the results for ‘must’ are also presented in this section.



**Table 0.11 Variables that are assigned to the top 5 of most important variables (category ‘must’)**

	Frequencies				
	Authorities	National fire services	Other	EU-27	Non-EU
<i>Total number of countries / respondents</i>	15	12	14	27	4
Type of building	15	10	12	25	4
Fire safety measures present	12	10	11	22	4
Construction type	8	8	9	19	1
Number of floors	13	8	7	18	2
Construction characteristics	5	5	6	11	0
Building dimension	6	4	3	10	1
Floor measurement dimension	6	2	3	9	0
Position of inner doors	2	4	3	5	0
Year of construction	2	0	5	5	0
Ownership situation	1	1	1	2	3

When it comes to building characteristics, almost all respondents mentioned that ‘type of building’ must be included in a harmonized data collection. ‘Fire safety measures present’ was also mentioned by a large majority of the respondents. More than half of the respondents mentioned ‘number of floors’ and ‘construction type’. ‘construction characteristics’ were mentioned by about more than a third of the respondents.

There are no striking differences when comparing the results from the three types of organizations.

**Additional information on the data that must be collected on building characteristics**

In addition to the variables listed in the questionnaire, respondents were also asked to describe any other variables that they considered must be collected. According to one respondent, whether a building is a high-rise building (or not) must be included. In addition to the variable ‘fire safety measurements present’, information on the performance of fire safety systems must also be included. The presence of a smoke detector was also mentioned. Information on (the presence of) fire compartment is mentioned. Escapeways (where the escapeways are useful for evacuation of people) was information that was indicated as a must.

The following other information was mentioned when it comes to the use or nature of the building:

- > Hazards present
- > Type of use of the room of origin
- > Windows open or closed
- > Activity within the building related to the type of building.

Finally, a respondent mentioned that information on the insurance of the building (insured or not) must be included and preventive measures (e.g. fire inspections) before the incident was mentioned. Similar to that are organizational fire prevention measures on site (e.g., fire safety engineer, works fire brigade, implemented fire prevention management system).

**Table 0.12 Variables that are assigned to the category ‘should be included in a harmonized data collection’**

	Frequencies		
	Authorities	National fire services	Other
<i>Total number of respondents</i>	15	12	14
Building dimension	7	5	10
Floor measurement (m2) dimension	6	6	9
Year of construction	8	5	8
Construction characteristics (e.g. façade, claddings)	9	6	5
Position of inner doors (open or closed)	5	7	8
Construction type (e.g. reinforced concrete, steel)	6	5	5
Number of floors	2	4	5
Ownership situation (rental or private property)	5	1	3
Fire safety measures present (e.g. alarm system, compartmentation)	1	4	2
Type of building (e.g. residential or non-residential)	0	1	2

More than half of the respondents stated that ‘building dimension’, ‘floor measurements dimension and ‘year of construction’ should be collected. Slightly less than half of the respondents mentioned ‘construction characteristics, position of inner doors’, and ‘year of construction’.

‘Building dimension’ was mentioned by less than half of the respondents from the national fire services, compared to the two other types of organizations, of which more than half of the respondents mentioned this variable. The same applies to ‘year of construction’. Ministries indicated that ‘ownership situation’ should be collected much more than other organization types.

**Table 0.10.3 Variables that are assigned to the category ‘could be included in a harmonized data collection’**

	Frequencies		
	Authorities	National fire services	Other
<i>Total number of respondents</i>	15	12	14
Ownership situation (rental or private property)	7	9	9
Year of construction	5	7	1
Position of inner doors (open or closed)	5	0	2
Floor measurement (m2) dimension	1	3	1
Construction characteristics (e.g. façade, claddings)	1	0	3
Building dimension	1	1	1
Construction type (e.g. reinforced concrete, steel)	1	0	0
Fire safety measures present (e.g. alarm system, compartmentation)	1	0	0
Number of floors	0	0	1
Other, namely	0	0	1

The opinion of the respondents was that only ‘ownership situation’ (mentioned by more than half of the respondents) and the year of construction of the building could be collected as well – this variable was mentioned by about one third of the respondents. ‘Type of building’ was not mentioned by the respondents. When looking at the results for the three types of organizations, ‘Year of construction’ was mentioned often by the respondents from the authorities and the national fire services, however it was only mentioned by one respondent from ‘other’ organization type. ‘Position of inner doors’ was mentioned by a third of the respondents from the authorities but this variable was not (often) mentioned by the fire service or ‘other’.

**Question 7. Related to fire characteristics, which variables are needed to provide meaningful datasets of building fires for allowing legislative and other policy decisions on fire safety in your country?**

Question 7 focuses on the variable(s) that must / should / could be collected with regards to fire characteristics related to building fires. Respondents could assign thirteen different variables for this question of which a top 5 for must and an unlimited number of variables for should / could. Respondents could also add one or more variables not indicated in the list by describing them into ‘other, namely’. Respondents used this option for this question and the results for ‘must’ are also presented in this section.

**Table 0.14 Variables that are assigned to the top 5 of most important variables (category ‘must’)**

	Frequencies				
	Authorities	National fire services	Other	EU-27	Non-EU
<i>Total number of countries / respondents</i>	15	12	14	27	4
Fire cause	13	12	12	26	4
Room of origin	10	8	11	20	2
Source of ignition	9	11	10	20	4
Material mainly responsible for fire development	6	6	4	11	1
Size of fire spread	6	3	3	9	1
Date	6	3	5	8	3
Item first ignited	4	2	6	8	2
Material first ignited	1	3	5	7	0
Speed of fire growth	4	1	3	6	0
Direction of fire spread	3	2	2	4	0
Size of smoke spread	3	1	1	4	0
Weather	0	0	1	1	2

The ‘Fire cause’ is a variable that must be included in a harmonized data collection according to almost all the respondents. ‘Source of ignition’, ‘room of origin of the fire’ were mentioned by almost three quarter of the respondents There are no striking differences on the organization level.

**Additional information on the data that must be collected on fire characteristics**

In addition to the variables listed in the questionnaire, respondents were also asked to describe any other variables that they considered must be collected. As well as fire and smoke characteristics, the reach of flashover, types of flames (diffusive or premixed), and toxins within the smoke were mentioned. Additional information as to the fire cause that is considered to be a must is any human factors related to the cause or the root cause (indirect cause).

**Table 0.15 Variables that are assigned to the category ‘should be included in a harmonized data collection’**

	Frequencies		
	Authorities	National fire services	Other
<i>Total number of respondents</i>	15	12	14
Item first ignited	8	7	6
Material first ignited	9	4	8
Size of fire spread	6	7	8
Size of smoke spread	5	7	8
Speed of fire growth	8	6	5
Direction of fire spread (horizontally or vertically)	8	7	3
Material mainly responsible for the fire development	7	3	8
Date	6	4	4
Time of day/night	7	4	3
Room of origin	6	1	4
Source of ignition	6	2	3
Weather	5	2	4
Fire cause	2	0	1
Other, namely	2	0	1

‘Item first ignited’, ‘material mainly responsible for fire development’ and ‘size of smoke spread’ were mentioned by about half of the respondents as a variable that should be included in a harmonized data collection. This was followed by ‘size of smoke spread’ and ‘speed of fire growth’, mentioned by less than half of the respondents.

‘Material first ignited’ was mentioned by less than half of the respondents from the national fire services, compared to more than half of the respondents of the authorities and ‘other’ who mentioned this variable.

**Table 0.16 Variables that are assigned to the category ‘could be included in a harmonized data collection’**

	Frequencies		
	Authorities	National fire services	Other
<i>Total number of respondents</i>	15	12	14
Weather	7	7	9
Direction of fire spread (horizontally or vertically)	3	3	6
Date	3	4	4
Speed of fire growth	2	4	3
Size of smoke spread	5	1	2
Material first ignited	1	3	1
Material mainly responsible for the fire development	1	2	1
Size of fire spread	2	1	1
Time of day/night	1	0	3
Item first ignited	0	2	1
Room of origin	0	2	0
Source of ignition	0	1	1
Fire cause	0	0	1
Other, namely	0	0	1

‘Weather’ is a variable that was mentioned by more than half of the respondents as a variable that could be collected. The same applies to the direction of fire spread (horizontally or vertically) and ‘date’, which were mentioned by about one third of the respondents.

The size of the smoke spread is a variable that was mainly indicated by the Ministries as ‘could be collected’. The other answers were consistent among the type of organizations.

**Question 8. Related to intervention characteristics, which variables are needed to provide meaningful datasets of building fires for allowing legislative and other policy decisions on fire safety in your country?**

Question 8 focuses on the variable(s) that must / should / could be collected with regards to intervention characteristics related to building fires. Respondents could assign nineteen different variables for this question of which a top 5 for must and an unlimited number of variables for should / could. Respondents could also add one or more variables not indicated in the list by describing them into ‘other, namely’. Respondents used this option for this question and the results for ‘must’ are also presented in this section.

**Table 0.17 Variables that are assigned to the top 5 of most important variables (category ‘must’)**

	Frequencies				
	Authorities	National fire services	Other	EU-27	Non-EU
<i>Total number of countries / respondents</i>	15	12	14	27	4
Incident location	12	6	7	19	2
Fire brigade response time	6	8	8	15	3
Fire detection time	7	6	7	14	1
Incident date	7	3	7	14	2
Incident time	7	5	9	14	2
Operation of fire safety measures	6	4	6	12	2
Fire brigade on site	4	4	4	10	0
Type of incident	4	5	4	9	2
Evacuation measures	4	3	4	8	1
Type of call	4	3	3	7	3
Number of attended fire brigade vehicles / firefighters	2	2	2	5	0
Occupant response time	3	1	4	5	0
Fire extinguishment time by fire brigade	2	1	3	4	0
Occupant rescue time by fire brigade	3	4	1	4	0
Occupant extinguishing action	1	3	0	3	1
Time between incident and casualty	0	3	1	3	0
Time between fire brigade arrival and withdrawal	1	1	2	2	0
Fire brigade set up time	0	1	1	1	0
Firefighting operations	1	1	0	0	0

‘Incident location’ is a variable that must be included in harmonized data collection according to almost half of the respondents. Other often mentioned variables were: ‘Fire brigade response time’, ‘incident date’, ‘incident time’ and ‘fire detection time’.

The variable ‘Incident date’ was mentioned less often by the respondents from the fire brigade compared to the results for authorities and ‘other’.

#### **Additional information on the data that must be collected on intervention characteristics**

In addition to the variables listed in the questionnaire, respondents were also asked to describe any other variables that they considered must be collected. As regards the equipment used, some additional information was a must: specialist equipment used, type and number of equipment used, and (the type) of extinguishing agents used.

Information was also thought necessary about problems with the accessibility of the building (e.g. difficulties with accessing / approaching the building). Furthermore, information about the type or kind of internal or external alerting(system) was mentioned. As regards firefighting operations, the reinforcement of initial resources was mentioned as must be included.

**Table 0.18 Variables that are assigned to the category ‘should be included in a harmonized data collection’**

	Frequencies		
	Authorities	National fire services	Other
<i>Total number of respondents</i>	15	12	14
Number of attended fire brigade vehicles / firefighters	10	5	8
Type of call (fire or false alarm)	11	5	7
Fire brigade set up time	7	7	7
Occupant extinguishing action	8	6	4
Occupant response time	5	7	6
Time between fire brigade arrival and withdrawal	7	5	6
Type of incident (deliberate or accidental)	8	5	5
Evacuation measures	6	5	6
Fire brigade on site	6	4	7
Fire extinguishment time by fire brigade	8	6	3
Occupant rescue time by fire brigade	6	3	8
Fire detection time	4	6	5
Operation of fire safety measures (e.g. compartmentation, fire barriers, escape routes)	7	4	4
Time between incident and casualty	6	4	5
Fire brigade response time (notification, dispatch, preparation, travel time)	5	4	5
Firefighting operations (e.g. offensive attack)	6	3	5
Incident time	6	5	3
Incident date	5	4	3
Incident location	2	4	4
Other, namely	0	0	1

More than half of the respondents indicated that the variable ‘type of call’ and ‘number of attended fire brigade vehicles / firefighters’ should be included in a harmonized data collection. ‘Fire brigade setup time’ was mentioned by half of the respondents. More than one third of the respondents indicated that ‘occupant extinguishing action’, ‘occupant response time’, ‘time between fire brigade arrival and withdrawal’, and ‘type of incident (deliberate or accidental)’, should be collected.

‘Occupant extinguishing action’ was mentioned less by ‘other’ than by respondents from ministries and the national fire services.

**Table 019 Variables that are assigned to the category ‘could be included in a harmonized data collection’**

	Frequencies		
	Authorities	National fire services	Other
<i>Total number of respondents</i>	15	12	14
Firefighting operations (e.g. offensive attack)	5	5	5
Time between fire brigade arrival and withdrawal	4	4	5
Fire brigade set up time	5	3	3
Occupant extinguishing action	3	3	5
Fire extinguishment time by fire brigade	2	2	5
Incident date	2	4	3
Number of attended fire brigade vehicles / firefighters	2	4	3
Occupant rescue time by fire brigade	3	3	1
Time between incident and casualty	3	2	2
Evacuation measures	2	1	3
Fire brigade on site	3	2	1
Fire brigade response time (notification, dispatch, preparation, travel time)	4	1	1
Type of call (fire or false alarm)	0	2	3
Type of incident (deliberate or accidental)	2	1	2
Incident time	1	2	1
Occupant response time	3	1	0
Operation of fire safety measures (e.g. compartmentation, fire barriers, escape routes)	0	3	1
Fire detection time	2	0	1
Incident location	1	0	2

Most respondents indicated that the variable ‘firefighting operations’, followed by: ‘time between fire brigade arrival and withdrawal’ could be included in a harmonized data collection. About a quarter of the respondents indicated that ‘fire brigade set up time’ and ‘occupant extinguishing action’, could be included. There were no striking differences when looking at the results for the three organization types.



**Question 9. Which fields of interest should harmonized European fire statistics cover?**

Four or less of the most imported variables listed in the questionnaire could be selected by the respondents and there was also the possibility to add a variable that was not mentioned in the list if the respondent thought that this was an important variable. The respondents selected an average of four variables.

**Table 0.20 Fields of interest**

	Frequencies				
	Authorities	National fire services	Other	EU-27	Non-EU
<i>Total number of countries / respondents</i>	15	12	14	27	4
Protective measures in buildings	14	11	11	24	2
Health aspects	14	7	9	21	3
Fire safety behaviour of occupants / residents	10	9	6	18	3
Performance of fire service operations	8	8	6	17	2
Economic aspects	6	3	8	12	1
Environment impacts	2	7	5	9	1
Consumer product safety	3	1	7	8	1
Impact on society	0	3	2	4	1

The highest number of responses were reached for 'proactive measures' and 'health aspects', followed by 'fire safety behaviour' and 'performance of fire safety operations' which were mentioned by more than half of the respondents. The fields with the lowest number of responses were 'consumer product safety' and 'impact on society'.

When the answers were investigated based on organization type, the findings obtained were similar to the results for all respondents, however, with some differences worthy of discussion. Based on the answers received from authorities and national fire services, the fields that should be covered by a harmonized fire statistics were once again 'proactive measures' and 'health aspects'. This is followed by 'fire safety behaviour' and 'performance operations'. For the national fire services, the results are similar. For 'other', 'economic aspects' appears as a relevant field. Considering the information received by respondents on variables that are not listed in the questionnaire, 'high level definitions' and 'causes of fire' should be covered by the harmonized statistics where social, economic, and environmental impacts play a critical role.

**Question 10. Do you feel there are any additional statistical variables that are not covered within the previously mentioned characteristics which are needed for policymaking and/or decisions? If so, what are they?**

Question 10 is based on the possible additional variables that are not covered in the previously mentioned characteristics that were discussed in the questionnaire as being needed for policymaking and/or decisions. The responses (in open text fields) received have been classified according to four major areas: information about the fire service, information about fire incidents, fire safety systems, and the impact of fire incidents.

For the information about fire service, some respondents highlighted the need of knowing the number of firefighters per inhabitants and specific information about the fire brigade such as fire Service Cover Modelling, duty systems, application for Fire Safety Prevention and Intervention Data, workforce data, fleet data, training and occupational Standards data. The research developed in the EU FireStat project is mainly based on fire statistics related to pre- and post-fire conditions of buildings and information about the fire service has not been included in the analysis, even if an evaluation of such fields appear important for safety and organizational reasons.

Respondents also addressed several fields related to the description of the fire incidents. Some aspects are already covered by fire statistics such as fire causes, damaged equipment, dangerous substances, and type of rescue operations. However, from the analysis of question 10, further information is required for what concerns the cooperation with other emergency services, the investigation of building collapse, and the

evaluation of electric and gas plants compliancy with regulations. Furthermore, more specific details about causal factors and behaviours, product safety, and building performance are stated as potential fields to be included where the importance of detailed incident-related data needs to be recognized by regulations. The responses received for fire safety measures can be classified according to alarms and automatic extinguishing systems that are already covered in several fire statistics recording systems which include type, operation, and failure. However, the effects of such safety measures with regard to the safety of occupants and in limiting the fire consequences are not always properly investigated. Finally, the last group of answers received is related to the impact of fire incidents. Health aspects and the impact on society, as well as the economic impact, are fundamental for a comprehensive evaluation of the fire event and should include the indirect consequences which arise once the fire has been extinguished.

## OVERVIEW ANALYSIS STOCKTAKING CONSORTIUM

This section presents the results of the stocktaking of the opinion of the consortium partners. In addition to brainstorming sessions, the survey, as it was distributed to the stakeholders, was also completed by the consortium partners.<sup>9</sup> In total all nine consortium partners completed the questionnaire.

### **Question 1. In practice, what types of buildings should be included in a harmonized data collection?**

Almost all respondents (8/9) indicated that all type of buildings should be included in the data collection. One respondent selected specific building types, namely residential, healthcare, industrial and educational buildings, and 'hotels (commercial accommodation)' which can be grouped under leisure buildings (one of the possibly answers).

### **Question 2. What should be the ultimate objective of harmonized European fire statistics?**

Respondents could select four or less of the nine variables listed in the questionnaire or they could add another variable of their preference that was not listed. The respondents selected an average of three variables. Over two-thirds (7/9) of the respondents indicated that research should be the ultimate objective of harmonized European fire statistics. More than half (5/9) of the respondents mentioned the evaluation of existing policy. Most of these respondents indicated that the harmonized European fire statistics' ultimate objective should be supporting the evaluation of existing policy on both EU and national levels. One respondent indicated that this should be done at a national level. Almost half (4/9) of the respondents indicated that the formulation and implementation of policy should be the ultimate objective of harmonized European fire statistics. Most of these respondents indicated that the harmonized European fire statistics should support the formulation and implementation of policy on both EU and national levels. One respondent indicated that this should be done at an EU level. Moreover, almost half (4/9) of the respondents indicated that supporting the management of fire service organizations should be the ultimate objective of harmonized European fire statistics.

**Question 3** was not included in the analysis for this section.

### **Question 4. *If we focus only on the consequences of building fires, which variables are needed to provide meaningful datasets for allowing legislative and other policy decisions in your country?***

Question 4 focuses on the variable(s) that must / should / could be collected with regards to the consequences of building fires.

#### **Variables that are assigned to the top 5 of most important variables (category 'must')**

The respondents selected an average of two variables. Two-thirds (6/9) of the respondents indicated that the fire spread at the final situation must be included to provide meaningful datasets for allowing legislative and other policy decisions. Almost half (4/9) of the respondents mentioned the fire spread at the time of the fire brigade arrival. The following variables were mentioned once: type of property damage, quantification of property damage, effectiveness of fire safety measures and costs incurred to insurance companies. 'Direct fire costs', 'indirect fire costs', 'type of insurance of losses', 'environmental consequences' and 'social consequences' are not categorized as a must by the respondents.

#### **Variables that are assigned to the category 'should be included in a harmonized data collection'.**

One-third (3/9) of the respondents indicated that the fire spread at the time of the fire brigade arrival should be included to provide meaningful datasets for allowing legislative and other policy decisions. Two respondents indicated that the fire spread at the final situation and the cost incurred by insurance companies should be included. Two variables were mentioned by only one respondent: environmental consequences and the reasons for failure of fire safety measures.

#### **Variables that are assigned to the category 'could be included in a harmonized data collection'**

Over half (5/9) of the respondents indicated that the costs incurred by insurance companies could be included to provide meaningful datasets for allowing legislative and other policy decisions. Less than two-thirds (2/9) of the respondents indicated that the fire spread at the time of the fire brigade arrival could be included. Four variables were mentioned once: the fire spread at the final situation, the direct fire costs, the indirect fire costs and the type of insurance of losses.

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<sup>9</sup> Question 3 is not included in the analysis for this section and no answers were given to question 10.

**Question 5. Related to human characteristics, which variables are needed to provide meaningful datasets of building fires for allowing legislative and other policy decisions on fire safety in your country?**

Question 5 focuses on the variable(s) that must / should / could be collected with regards to human characteristics.

**Variables that are assigned to the category 'must be included in a harmonized data collection'**

The respondents selected an average of four variables. All respondents indicated that 'number of victims' must be included in a harmonized data collection. Most of the respondents indicated that 'age' must be included. More than half of the respondents mentioned 'gender'. Drug or alcohol usage was mentioned by a third of the respondents. Other variables: 'type of causality', 'sleep / awake', 'smoker / non-smoker', 'disability' and 'type of household' were mentioned by two or less respondents. The 'number of victims', 'number of occupants present in the building', 'role', 'ethnicity', 'profession' and 'income category' are not categorized as a must by the respondents.

**Variables that are assigned to the category 'should be included in a harmonized data collection'**

More than half of the respondents mentioned that 'smoker / non-smoker' should be included. Almost half of the respondents (4/9) mentioned: 'sleep / awake', 'drug or alcohol usage' and 'disability'. Other variables were mentioned by two or three of the respondents. Role is mentioned by one respondent.

**Variables that are assigned to the category 'could be included in a harmonized data collection'**

The variables 'sleep / awake', 'smoker / non-smoker', 'drug or alcohol usage' and 'disability' were mentioned by almost half of the respondents (4/9). Other variables were mentioned by two or three respondents.

**Question 6. Related to building characteristics, which variables are needed to provide meaningful datasets for allowing legislative and other policy decisions on fire safety in your country?**

Question 6 focuses on the variable(s) that must / should / could be collected with regards to building characteristics related to building fires.

**Variables that are assigned to the top 5 of most important variables (category 'must')**

The respondents selected an average of one variable. Almost half of the respondents (4/9) mentioned 'number of floors' as data that must be collected. Some variables were mentioned by two respondents: 'building dimension', 'position of inner doors' and 'year of construction'. Variables mentioned only one time were: 'type of building' and 'fire safety measures present'. 'Construction type', 'construction characteristics', 'floor measurement (m<sup>2</sup>) dimension' and 'ownership situation' are not categorized as a must by the respondents.

**Variables that are assigned to the category 'should be included in a harmonized data collection'**

'Number of floors' and 'year of construction' were mentioned by more than half (5/9) of the respondents as a variable that should be included in a harmonized data collection. Variables mentioned by almost half of the respondents (4/9) were 'building dimension' and 'floor measurement dimension'. 'Construction type' and 'construction characteristics' were only mentioned by one respondent.

**Variables that are assigned to the category 'could be included in a harmonized data collection'**

More than half (5/9) respondents mentioned 'ownership situation' as a variable that could be included in a harmonized data collection. 'Building dimension' and 'floor measurements' were mentioned by some respondents (2/9). One respondent mentioned 'position of inner doors' as a variable that could be included.

**Question 7. Related to fire characteristics, which variables are needed to provide meaningful datasets of building fires for allowing legislative and other policy decisions on fire safety in your country?**

Question 7 focused on the variable(s) that must / should / could be collected with regards to fire characteristics related to building fires.

**Variables that are assigned to the top 5 of most important variables (category 'must')**

The respondents selected an average of five variables. Almost all respondents (8/9) mentioned 'room of origin' as a variable that must be included in a harmonized data collection. 'Fire cause' (7/9) and 'item first ignited' (6/9), and 'source of origin' (6/9) were mentioned by most of the respondents. Other variables were mentioned by less than half of the respondents or only by a couple of them. 'Speed of fire growth', 'direction of fire spread' (horizontally or vertically) and 'weather' were not characterized by respondents as a must.

**Variables that are assigned to the category 'should be included in a harmonized data collection'**

'Time of day' (5/9) and 'date' (5/9) were mentioned by more than half of the respondents as variables that should be included in a harmonized data collection. Almost half of the respondents mentioned 'material first ignited' (4/9). Other variables were mentioned three times or less.

**Variables that are assigned to the category 'could be included in a harmonized data collection'**

Almost half of the respondents mentioned weather (4/9) as a variable that could be included in a harmonized data collection. Two respondents mentioned 'speed of fire growth'. Variables that were mentioned by one respondent were: 'size of fire spread', 'direction of fire spread' and 'date'.

**Question 8. Related to intervention characteristics, which variables are needed to provide meaningful datasets of building fires for allowing legislative and other policy decisions on fire safety in your country?**

Question 8 focuses on the variable(s) that must / should / could be collected with regards to intervention characteristics related to building fires.

**Variables that are assigned to the top 5 of most important variables (category 'must')**

The respondents selected an average of three variables. More than half of the respondents (5/9) indicated that 'incident date' must be included in a harmonized data collection. Other variables mentioned by less than half of the respondents (3/9) were: 'incident time', 'incident location', 'type of call', 'fire brigade on site' and 'number of vehicles / firefighters'. Variables mentioned by one respondent were: 'fire detection time', 'occupant response time', 'fire brigade response time', 'fire brigade set up time', 'occupant rescue time by fire brigade', 'fire extinguishment time by fire brigade', 'time between incident and casualty' and 'occupant extinguishing action'. 'Type of incident (deliberate or accidental)', 'time between fire brigade arrival and withdrawal', 'firefighting operations', 'operation of fire safety measures' and 'evacuation measures' were not characterized by respondents as a must.

**Variables that are assigned to the category 'should be included in a harmonized data collection'**

A variable that was mentioned by more than half of the respondents (5/9) is 'fire brigade on site'. Furthermore 'type of call' and 'occupant rescue time by fire brigade' were mentioned by almost half of the respondents (4/9). Some other variables were mentioned by three or less respondents.

**Variables that are assigned to the category 'could be included in a harmonized data collection'**

'Occupant rescue time by fire brigade' and 'Fire brigade on site' were mentioned by almost half of the respondents (4/9) as variables that could be included. Variables that were mentioned by three respondents were: 'type of call' and 'fire extinguishment time by fire brigade'. Other variables were mentioned by two or less respondents.

**Question 9. Which fields of interest should harmonized European fire statistics cover?**

Four or less of the most imported variables listed in the questionnaire could be selected by the respondents and there was also the possibility to add a variable that was not mentioned in the list if the respondent thought that this was an important variable. The respondents selected an average of two variables. All of the respondents indicated that harmonized European fire statistics should cover the field of protective measures in buildings. Almost half (4/9) of the respondents mentioned the 'performance of fire service organizations' and one-third (3/9) of the respondents mentioned the 'consumer product safety' as the field of interests that should be covered. The impact on society, fire safety behaviour of occupants/residents, and health aspects were mentioned as fields of interest to be covered by one respondent.

**Question 10. Do you feel there are any additional statistical variables that are not covered within the previously mentioned characteristics which are needed for policymaking and/or decisions? If so, what are they?**

No answers given.

## OVERVIEW COMPARISON QUESTIONNAIRE AND STOCKTAKING

This section presents the main opinions regarding the data needed for decision making given by the stakeholders. The opinions are summarized in tables: for the stakeholders per type of organization as well as for the stakeholders in total, and for the consortium in total. The tables only relate to the answers given regarding 'must'.

### Question 1. In practice, what types of buildings should be included in a harmonized data collection?

**Table 0.21 Types of buildings / scope**

	Authorities	National fire services	Other	Stakeholders	Consortium
<i>Total number of respondents</i>	15	12	14	27	4
All types of buildings	73%	83%	79%	81%	89%
(Animal) farming	0%	17%	14%	7%	0%
Accommodation	13%	17%	7%	11%	0%
Detention	13%	17%	7%	11%	0%
Educational	13%	17%	14%	11%	11%
Health care	20%	17%	14%	15%	11%
Hotels (com. acc.)	0%	0%	0%	0%	11%
Industrial	13%	17%	29%	19%	11%
Leisure	7%	8%	7%	7%	0%
Meeting	7%	17%	7%	7%	0%
Office	13%	17%	14%	15%	0%
Residential	13%	25%	29%	19%	11%
Shop	13%	17%	7%	11%	0%
Sport	7%	17%	7%	7%	0%

**Question 2. What should be the ultimate objective of harmonized European fire statistics?**

**Table 0.22 Ultimate objective**

	Authorities	National fire services	Other	Stakeholders	Consortium
<i>Total number of respondents</i>	15	12	14	27	4
Identifying fire risks of products phenomena or events	73%	58%	79%	67%	0%
Research	40%	42%	64%	59%	78%
Supporting the management of fire service organizations	33%	67%	43%	52%	44%
Supporting the education of and information for citizens	60%	42%	43%	52%	22%
Cost-benefit analysis of fire safety measurements and activities	40%	58%	50%	48%	33%
Formulation/implementation of legislation	40%	50%	14%	44%	22%
Evaluation of existing legislation	47%	42%	21%	41%	22%
Formulation/implementation of policy	33%	33%	29%	37%	44%
Evaluation of existing policy	20%	33%	43%	33%	56%
Analysis of statistics	0%	0%	0%	0%	0%

**Question 4. If we focus only on the consequences of building fires, which variables are needed to provide meaningful datasets for allowing legislative and other policy decisions in your country?**

**Table 0.23 Consequences of building fires**

	Authorities	National fire services	Other	Stakeholders	Consortium
<i>Total number of respondents</i>	15	12	14	27	4
Effectiveness of fire safety measures in reducing the fire	67%	75%	79%	78%	11%
Quantification of property damage	53%	58%	57%	59%	11%
Type of property damage	53%	50%	50%	56%	11%
Reason for failure of fire safety measures	53%	33%	64%	56%	0%
Direct fire costs	47%	58%	57%	52%	0%
Environmental consequences	27%	50%	43%	37%	0%
Fire spread at final situation	40%	33%	29%	30%	67%
Fire spread at fire brigade arrival	27%	33%	36%	19%	44%
Type of insurance of losses	7%	17%	7%	11%	0%
Cost incurred to insurance companies	7%	0%	7%	7%	11%
Indirect costs	13%	0%	7%	7%	0%
Social consequences	7%	17%	7%	7%	0%

**Question 5. Related to human characteristics, which variables are needed to provide meaningful datasets of building fires for allowing legislative and other policy decisions on fire safety in your country?**

Table 0.24 Human characteristics

	Authorities	National fire services	Other	Stakeholders	Consortium
<i>Total number of respondents</i>	15	12	14	27	4
Type of casualty	92%	100%	95%	93%	11%
Number of victims	75%	100%	90%	89%	100%
Number of occupants in the building	58%	43%	44%	52%	0%
Age	33%	50%	46%	48%	78%
Disability	50%	36%	41%	48%	22%
Role	50%	36%	44%	48%	0%
Type of household	33%	36%	32%	30%	22%
Gender	17%	7%	20%	19%	56%
Sleep / awake	25%	21%	24%	19%	22%
Smoker / non-smoker	8%	7%	10%	15%	22%
Drug or alcohol usage	8%	7%	7%	7%	33%
Income category	0%	7%	2%	4%	0%
Ethnicity	0%	0%	0%	0%	0%
Profession	0%	0%	0%	0%	0%

**Question 6. Related to *building characteristics*, which variables are needed to provide meaningful datasets for allowing legislative and other policy decisions on fire safety in your country?**

Table 0.25 Building characteristics

	Authorities	National fire services	Other	Stakeholders	Consortium
<i>Total number of respondents</i>	15	12	14	27	9
Type of building	83%	86%	90%	93%	11%
Fire safety measures present	83%	79%	80%	81%	11%
Construction type	67%	64%	61%	70%	0%
Number of floors	67%	50%	68%	67%	44%
Construction characteristics	42%	43%	39%	41%	0%
Building dimension	33%	21%	32%	37%	22%
Floor measurement dimension	17%	21%	27%	33%	0%
Position of inner doors	33%	21%	22%	19%	22%
Year of construction	0%	36%	17%	19%	22%
Ownership situation	8%	7%	7%	7%	0%



**Question 7. Related to *fire characteristics*, which variables are needed to provide meaningful datasets of building fires for allowing legislative and other policy decisions on fire safety in your country?**

**Table 0.26 fire characteristics**

	Authorities	National fire services	Other	Stakeholders	Consortium
<i>Total number of respondents</i>	15	12	14	27	9
Fire cause	100%	86%	90%	96%	78%
Room of origin	67%	79%	71%	74%	89%
Source of ignition	92%	71%	73%	74%	67%
Material mainly responsible for fire development	50%	29%	39%	41%	44%
Size of fire spread	25%	21%	29%	33%	33%
Item first ignited	17%	43%	29%	30%	67%
Date	25%	36%	34%	30%	22%
Material first ignited	25%	36%	22%	26%	22%
Speed of fire growth	8%	21%	20%	22%	0%
Size of smoke spread	8%	7%	12%	15%	44%
Direction of fire spread	17%	14%	17%	15%	0%
Weather	0%	7%	2%	4%	0%

**Question 8. Related to intervention characteristics, which variables are needed to provide meaningful datasets of building fires for allowing legislative and other policy decisions on fire safety in your country?**

**Table 0.27 Intervention characteristics**

	Authorities	National fire services	Other	Stakeholders	Consortium
<i>Total number of respondents</i>	15	12	14	27	9
Incident location	80%	50%	50%	70%	33%
Fire brigade response time	40%	67%	57%	56%	11%
Incident date	47%	25%	50%	52%	56%
Incident time	47%	42%	64%	52%	33%
Fire detection time	47%	50%	50%	52%	11%
Operation of fire safety measures	40%	33%	43%	44%	0%
Fire brigade on site	27%	33%	29%	37%	33%
Type of incident	27%	42%	29%	33%	0%
Evacuation measures	27%	25%	29%	30%	0%
Type of call	27%	25%	21%	26%	33%
Occupant response time	20%	8%	29%	19%	11%
Number of attended fire brigade vehicles / firefighters	13%	17%	14%	19%	0%
Occupant rescue time by fire brigade	20%	33%	7%	15%	11%
Fire extinguishment time by fire brigade	13%	8%	21%	15%	0%
Occupant extinguishing action	7%	25%	0%	11%	0%
Time between incident and casualty	0%	25%	7%	11%	0%
Time between fire brigade arrival and withdrawal	7%	8%	14%	7%	0%
Fire brigade set up time	0%	8%	7%	4%	0%
Firefighting operations	7%	8%	0%	0%	0%

**Question 9. Which fields of interest should harmonized European fire statistics cover?**

**Table 0.28 Fields of interest**

	Authorities	National fire services	Other	Stakeholders	Consortium
<i>Total number of respondents</i>	15	12	14	27	9
Protective measures in buildings	92%	79%	88%	89%	100%
Health aspects	58%	64%	73%	78%	11%
Fire safety behaviour of occupants / residents	75%	43%	61%	67%	11%
Performance of fire service operations	67%	43%	54%	63%	44%
Economic aspects	25%	57%	41%	44%	0%
Environment impacts	58%	36%	34%	33%	0%
Consumer product safety	8%	50%	27%	30%	33%
Impact on society	25%	14%	12%	15%	11%

ANNEX III – COMPARISON STOCKTAKING WITH RESULTS OF TASK 0

Table 0.29 Selection of results for task 0 for the EU-27

	Country	Austria	Belgium	Bulgaria	Croatia	Cyprus	Czech Republic	Denmark	Estonia	Finland	France	Germany	Greece	Hungary	Ireland	Italy	Latvia	Lithuania	Luxembourg	Malta	Netherlands	Poland	Portugal	Romania	Slovakia	Slovenia	Spain	Sweden	EU-27	EU-27
Fire incidents	Number of fires	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	26	96%
	Region/State			x	x	x		x	x			x	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	21	78%
	Month	x		x	x	x		x	x			x		x	x	x	x	x		x	x	x	x	x	x	x	x	x	21	78%
	Day	x	x	x	x	x		x	x	x		x		x	x	x	x	x		x	x	x	x	x	x	x	x	x	23	85%
	Hour	x		x	x	x		x	x				x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	21	78%
	Duration			x	x	x		x	x				x	x	x	x	x	x		x		x	x	x	x	x	x		18	67%
Fatalities and casualties	Number of fatalities	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x		x	x	x	x	x	x	x	x	x	25	93%
	Gender							x				x						x			x	x					x	x	7	26%
	Age							x				x						x				x	x				x	x	7	26%
	Number of injuries	x	x		x		x		x	x	x	x	x	x	x				x							x	x	x	14	52%
	Number of rescued	x						x						x								x						x	6	22%
	Missing persons														x														1	4%
	Number of involved							x	x		x			x								x							5	19%
	Firefighter fatalities							x	x		x	x														x	x	6	22%	
	Animals	x																											1	4%
Fire response	Number of interventions	x						x	x	x	x	x			x			x			x					x	x	x	12	44%
	Response time		x					x		x		x				x						x				x	x	8	30%	
	Situation at arrival							x														x				x	x	4	15%	
Building use and characteristics	Type of building or sector	x	x				x	x	x		x		x	x	x	x	x				x	x				x	x	x	16	59%
	Age of building																					x						x	2	7%
	Automatic extinguishing systems							x																			x	2	7%	
	Smoke detectors/alarm availability							x		x					x							x					x	5	19%	
Fire consequences	Damage (Cost)	x			x		x					x									x					x	x	7	26%	
	Injuries (cost)																										x	1	4%	
	Protected values (Cost)						x																					1	4%	
Fire causes	Fire causes	x					x	x		x		x		x	x	x	x				x	x				x	x	15	56%	
	Room of fire origin							x		x					x							x	x			x		8	30%	
	Location of victims																					x					x	2	7%	
	total	12	6	7	9	7	7	20	12	9	7	13	7	13	12	9	9	14	0	7	20	12	7	7	7	16	12	24		

**Table 0.30 Underlying table for the figures in 4.2 (part 1)**

Characteristics	Variable in figure	Variable task 2	Stakeholders	Consortium	Corresponding variable task 0	EU-27 (n)	EU-27 (%)
Human	Number of fatalities	Number of victims + Type of casualty	93%	11%	Number of fatalities	25	93%
	Number of injuries	Number of victims + Type of casualty	93%	11%	Number of injuries	14	52%
	Role (firefighter fatalities)	Role	48%	0%	Firefighter fatalities	6	22%
	Age	Age	48%	78%	Age	7	26%
	Gender	Gender	19%	56%	Gender	7	26%
	Number of occupants in the building (n of involved)	Number of occupants in the building	52%	0%	Number of involved	5	19%
	Location of victims	n/a	n/a	n/a	Location of victims	2	7%
	Missing persons	n/a	n/a	n/a	Missing persons	1	4%
Building	Type of building (or sector)	Type of building	93%	11%	Type of building or sector	16	59%
	Fire safety measures present (smoke detectors/alarm availability)	Fire safety measures present	81%	11%	Smoke detectors/alarm availability	5	19%
	Fire safety measures present (automatic extinguishing systems)	Fire safety measures present	81%	11%	Automatic extinguishing systems / Smoke detectors/alarm availability	2	7%
	Year of construction (age of building)	Year of construction	19%	22%	Age of building	2	7%
Fire	Fire cause	Fire cause	96%	78%	Fire causes	15	56%
	Room of origin	Room of origin	74%	89%	Room of fire origin	8	30%

**Table 0.31 Underlying table for the figures in 4.2 (part 2)**

Characteristics	Variable in figure	Variable task 2	Stakeholders	Consortium	Corresponding variable task 0	EU-27 (n)	EU-27 (%)
Intervention	Incident location (region/state)	Incident location	70%	33%	Region/State	21	78%
	Incident date (day)	Incident date	52%	56%	Day	23	85%
	Incident date (month)	Incident date	52%	56%	Month	21	78%
	Incident time (hour)	Incident time (day/night)	52%	33%	Hour	21	78%
	Fire brigade response time	Fire brigade response time	56%	11%	Response time	8	30%
	Number of fires	n/a	n/a	n/a	Number of fires	26	96%
	Time between fire brigade arrival and withdrawal (duration)	Time between fire brigade arrival and withdrawal	7%	0%	Duration	18	67%
	Type of call (number of interventions)	Type of call	26%	33%	Number of interventions	12	44%
	Number of rescued	Number of rescued	0%	22%	Number of rescued	6	22%
	Type of incident	Type of incident	33%	0%	n/a		
Consequences	Direct fire costs (damage, cost)	Direct fire costs	52%	0%	Damage (Cost)	7	26%
	Fire spread at fire brigade arrival (situation at arrival)	Fire spread at fire brigade arrival	19%	44%	Situation at arrival	4	15%
	Indirect costs (injuries, cost)	Indirect costs	7%	0%	Injuries (cost)	1	4%
	Cost incurred to insurance companies (protected values, cost)	Cost incurred to insurance companies	7%	11%	Protected values (Cost)	1	4%
	Animals		n/a	n/a	Animals	1	4%