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# Local health rules and building regulations: a survey on local hygiene and building regulations in Italian municipalities

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**Abstract**

***Introduction.*** WHO has highlighted the need to strengthen the relationship between health and built environment factors, such as inappropriate housing conditions. Local Health Rules (LHRs) and Building Regulations (BRs) are tools which provide safety and building hygiene in construction practices. Currently the Italian Government is considering to establish a National Building Regulation and, related to the following purpose, this paper presents a survey on the status of adoption and updating of LHRs and BRs in Italian municipalities.

***Methodology.*** The current Italian state of LHRs, BRs and Municipal Development Plans (MDPs) have been examined by a survey considering a sample of about 550 cities, with different demographic and geographic features, starting from the previous research work by Signorelli *et al.* (1999).

***Results.*** The analysis underlines a serious shortage of updated LHRs, especially in small and medium-sized municipalities whereas BRs and MDPs are widespread. Only 30% of them are previously approved and validated by Local Health Authorities.

***Conclusion.*** Starting from a survey, the present scenario of Building Regulations requires the introduction of further performance guidelines instead of normative ones and, therefore, the current actions to give rise to a National Building Regulation could be integrated by building hygiene contents of LHRs.

**Key words**

- local health rules
- building regulations
- Italian municipalities
- regulatory tools
- building hygiene

## INTRODUCTION

The World Health Organization (WHO) in the recent years has highlighted the need to implement several actions and strategies aimed at promoting appropriate relationships between health and environment to reduce and prevent chronic non-communicable diseases (NCDs).

Among the main factors, environmental risk factors and inadequate attention to housing conditions are the most harmful [1, 2], and therefore it is necessary to promote best practices for buildings construction and renovation [3].

This field of interest is crucial especially in relation to the current disparities across population's living conditions, according to economic class, geo-localization and ethnicity [4]. In fact, these differences, which have several impacts on the health status of citizens, depend mainly on some social changes taking place, increased by the economic crisis, including the phenomenon of population and immigration growth, aging and climatic changes [5].

Nowadays, despite the fact that growing strengthening and enhancements of local municipalities are defined by specific norms, such as the Italian Law No. 142/1990 [6] on local self-government of cities, municipal regulation issues continue to be controversial, especially in the small and medium-sized urban centres that are forced to adopt many municipal regulations (such as tax on real

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estate, land occupation, advertising, waste disposal, water filtration and aqueducts, etc.) without the main skills and resources within the municipal organization [7-9].

In addition to this scenario, health and hygiene demands tend not to be increasingly considered by most of local authorities, which consider that all the legislative aspects should be up to the Govern and Regions, delegating to the Local Health Authorities (LHAs) only operational assets [10]. Although on Italian territory LHAs are called with different acronyms (ASL, ULSS, ASP, ASS, etc.), they are in charge for the same functions and tasks[1].

In general, the first Italian Municipal Health Regulations date back to 1865 [11]. The Royal Decree No. 1265/1934 [12], i.e. Regulations on Health Laws, in relation to the Law No. 5849/1888 [13], reiterated the obligation for municipality to adopt its Local Health Rules. The Health Care Reform No. 883/1978 [14] stated that regions must supervise and define local hygiene and building regulations, that in turn was reinforced by Law No. 421/1992 [15], with the delegation to the Government for the rationalization and the revision of all the disciplines concerning health, public employment, welfare and local finance [16].

Subsequently, Presidential Decree No. 380/2001 [17], better known as Health and Hygiene Code, defined the normative autonomy of municipalities to ensure that specific requirements in relation to local needs would to be met. In fact, as Art. 344 of Royal Decree No. 1265/1934 stated, Local Health Rules (LHRs) contain the provisions influenced by the topography of urban centres and their territorial and environmental context. They concern for health care and public health surveillance, environmental and urban hygiene, drinking water quality, wholesomeness and authenticity of food and beverage industry, measures against the spread of infectious diseases, the mortuary regulations and, in general, the implementation of suitable actions for preventing and removing all causes of insalubrity [18]. According to the law, the Mayor acts as the highest health authority at the municipal scale.

Concurrently Building Regulations (and LHRs) operate at the urban and building scales. They were introduced with the National Spatial Planning Law No. 1150/1942 [19], currently abrogated by Presidential Decree No. 380/2001, and the definition of minimum heights and health requirements of living spaces by the Ministerial Decree (MD) No. 190/1975 [20], updated successively by MD No. 148/1999 [21].

This norm has an organic structure and contains technical standards for building construction, such as technical and aesthetics aspects, healthcare, safety, liveability and, in some cases, environmental sustainability of buildings [22]. It is promulgated and approved by the municipal council, then approved by the Regional Control Committee and, as in the case of several regions, by the LHA.

Currently Italy presents a general normative disorder because building hygiene aspects and standards can be found in both Building Regulations (BRs) and/or the Local Health Rules (LHRs), but sometimes also in technical standards of Municipal Development Plans (MDPs). Comparing several Building Regulations, written in different decades, it is evident the strong dissimilarity on the contents and definitions. Therefore, starting from these considerations, in relation to a previous survey carried out in 1999 on LHRs and BRs [23], a research group has investigated the current state of the art of the Country. The survey analyses safety and health aspects of built environments on LHRs and BRs of 553 selected municipalities with different geographical dimensions and size of population, verifying the application of hygienic issues to urban and building scales.

This analysis becomes useful for decision-making and other possible actions that the Government is implementing for the definition of a common National Building Regulation for all the municipalities, as Legislative Decree No. 90/2014 [24] states, and that could be also extended to the Local Health Rules [25].

## METHODOLOGY

To analyse the state of upgrade in Italy, a survey has verified the adoption, update and relevance of the following municipal rules and regulations related to urban and building safety and health:

- Local Health Rules (LHRs);
- Building Regulations (BRs);
- Municipal Development Plans (MDPs), replaced in some regions by the Plan of Territorial Government (PTG).

The Italian realities are different in both number of inhabitants and size of the territories: in fact, range of inhabitants varies from 33 (municipality of Monterone, Lecco, Lombardy) to 2 872 021 of Rome, the capital city of Italy. For this reason, to compare such uneven realities, the 7978 Italian municipalities[2] were divided into four categories, as the previous researches by Signorelli *et al*. [23] suggested:

- Type A: consisting of the Italian cities with the highest number of inhabitants (Bari, Bologna, Florence, Genoa, Milan, Naples, Rome, Turin, Venice and Palermo), well-known as metropolitan cities;
- Type B: consisting of approximately 150 municipalities with a population greater than 50 000 inhabitants;
- Type C: representing, approximately, 1800 cities with

1 In Italy, LHAs are called with different acronyms although all of them taking place approximately the same functions. They stand out in: *Azienda Sanitaria Locale (ASL)* in Abruzzo, Apulia, Campania, Lazio, Liguria, Piedmont and Sardinia; *Azienda USL della Valle d'Aosta (AUSL VDA)* in Aosta Valley; *Azienda Socio Sanitaria Territoriale (ASST)* in Lombardy; *Azienda Provinciale per i Servizi Sanitari* (APSS) in Trentino and *Azienda Sanitaria dell'Alto Adige (ASDAA)* in South Tyrol; *Unità Locale Socio Sanitaria (ULSS)* in Veneto; *Azienda per l'Assistenza Sanitaria (ASS)* in Friuli-Venezia Giulia; *Azienda Unità Sanitaria Locale (AUSL)* in Emilia-Romagna, Tuscany and Umbria; *Azienda Sanitaria Unica Regionale (ASUR)* in Marche; *Azienda Sanitaria Regionale del Molise (ASREM)* in Molise; *Azienda Sanitaria Provinciale (ASP)* in Basilicata, Calabria and Sicily.

2 In recent years the number of Italian municipalities decreased from 8103 (1999) to 7978 (June 2017). This is due to the merger of several cities, as issued by various Regional norms.

a population between 5000 and 50 000 citizens,
- Type D: consisting of nearly 6000 municipalities with population less than 5000 inhabitants.

Then, to determine a statistically significant sample of Italian municipalities, equally divided by region, 30 cities per region were analysed, subdivided according to the following criteria:
- 10 from types A and B (including all the Type A cities of the region plus others from type B to reach the number of 10 per region);
- 10 from type C;
- 10 from type D.

Specific considerations have been devoted to the regions not having an adequate number of inhabitants in the main urban centres, replaced by smaller urban centres (types C or D) to maintain 30 cities per each region; instead, for those regions having only types C and D municipalities, the investigation surveyed about 20 urban centres (Aosta Valley, Friuli-Venezia Giulia, Marche, Molise, Trentino-South Tyrol and Umbria), thus to guarantee a statistical comparison for common types for the whole country.

For each urban centre, a first scrutiny on the current adoption and finding of municipal rules and regulation was performed. The analysis was carried out through web searches (many information and regulations about municipal regulations are directly available on the institutional websites) or available at Town Hall or LHA offices. When documents could not be accessed via the web, competent bodies were contacted by email or phone. In this way, many small and medium-sized municipalities allowed to access to paper documents and the research team asked to the representatives of the technical offices all the general data useful for the analysis.

The final sample of the survey involved about 550 municipalities (1/16 of all the Italian cities) for a total of 24 100 600 inhabitants, which corresponds to about 40% of the entire Italian population, including all the major Italian realities.

Subsequently, detailed analysis of municipal regulations and building construction were conducted. To enable data uniformity, an Excel file was filled out for each municipality; it contains the following information, subdivided into four areas, as subdivided in *Table 1*.

For the compilation of municipality data, the research team has referred to *TuttItalia* web-site (www.tuttitalia.it), which reports relevant data concerning all the Italian municipalities, provinces and regions. The information about the population refer to National Statistics Institute (ISTAT) data updated to 01/01/2015. As might be expected, in general, there are considerable regional, climatic and dimensional differences among the municipalities.

The survey was conducted over a period of six weeks, between March and April 2016.

After collecting the data within an Excel spreadsheet, the data were elaborated to create several graphs and comparison tables for the individual sections LHR, BR and MDP, subdivided into types and regions.

## RESULTS

The final sample of survey involved 553 municipalities. *Table 2* provides a brief overview of the entire sample analysed. Northern and Southern Italy have a broad sample because they consist of several regions:
- Northern Italy: Aosta Valley, Emilia-Romagna, Friuli-Venezia Giulia, Liguria, Lombardy, Piedmont, Trentino-South Tyrol and Veneto;
- Central Italy: Lazio, Marche, Tuscany and Umbria;

**Table 1**
List of the criteria analysed

| Data analysis | Data |
|---|---|
| Municipality data | Name of the City<br>Province<br>Region<br>Number of inhabitants<br>Territorial surface area, measured in square kilometres ($km^2$)<br>Population density (inhabitants / $km^2$)<br>Elevation on the ground, in meters (m) above sea level<br>Climatic zone (the value of the degree-days per individual area), as defined by Presidential Decree No. 412/1993 [26]<br>Source of data<br>Year of the data, if the information has been carried out |
| Local Health Rules | Year of approval of LHR<br>Year of update of LHR<br>Source of data<br>Year of the data, if the information has been carried out |
| Building Regulations | Year of approval of BR<br>Year of update of BR<br>Verification and Approval by LHAs, if positive<br>Source of data<br>Year of the data, if the information has been carried out |
| Municipal Development Plan | Year of approval of MDP<br>Year of update of MDP<br>Verification and Approval by LHAs, if positive<br>Source of data<br>Year of the data, if the information has been carried out |

**Table 2**
Municipalities subdivided into Italian regions and their dimensional type

| Type | Northern Italy | Central Italy | Southern Italy and islands | Total per type |
|---|---|---|---|---|
| A - metropolitan cities | 5 | 2 | 3 | 10 |
| B - population greater than 50 000 inhabitants | 40 | 19 | 42 | 101 |
| C - population between 5000 and 50 000 citizens | 105 | 31 | 106 | 242 |
| D - populations of less than 5000 inhabitants | 88 | 39 | 73 | 200 |
| Total per geographical area | 238 | 91 | 224 | 553 |

- Southern Italy: Abruzzo, Apulia, Basilicata, Calabria, Campania and Molise;
- Islands: Sardinia and Sicily.

### *Local health rules*

Starting from the survey on the Italian municipalities, only the 30% (140 cities) have approved Local Health Rules. In fact, as *Table 3* shows, the municipalities "devoid of LHRs" are the majority (70%).

Other interesting data emerging from the survey were related to all the municipalities analysed, in terms of percentage: urban centres without the local health rules among the metropolitan and big size cities (types A-B) are lower. In fact, there are significant differences according to the type:

- within types A-B, only 65 municipalities of 111 have LHRs;
- within type C, only 71 urban centres of 242 have LHRs;
- within type D, only 29 cities of 200 have LHRs.

Therefore, it is more likely that LHR is lacking when the municipality is smaller. In general, this allows us to consider how few cities have implemented their regulations according to the national legislative requirements of hygienic issues as well as building hygiene [27]. Through the analysis of the contents, it has been observed that the building hygiene section is not always contemplated in the regulations. On the contrary, it disputes on animalistic hygienic aspects, food treatment, municipal waste, etc.; this is easily observed especially in medium and small urban centres (types C and D).

The survey also demonstrates that among all the municipalities in possession of LHRs (30%), only half of them (15%) has taken steps to adopt or update their documents after 2001. Among them, more than 20 municipalities in the last five years (2012-2016) have upgraded their LHRs; there are Arezzo (Tuscany), Bergamo (Lombardy), Cagliari (Sardinia), Catanzaro (Basilicata), Piacenza (Emilia Romagna), Ravenna (Emilia-Romagna), Reggio Emilia (Emilia Romagna) and Syracuse (Sicily). In most cases where the document is applied, in most cases there are efforts to update it by municipalities.

On the contrary, among the remaining 15% of municipalities that have updated their LHRs before 2001, the survey highlights that many of them were written before the Royal Decree No. 1265/1934, including Aosta (Aosta Valley), Campobasso (Molise), Gorizia (Friuli-Venezia Giulia), Ragusa (Sicily), Sestri Levante (Genoa, Liguria), Udine (Friuli-Venezia Giulia) and Vicenza (Veneto). In particular, aspects regarding specifically individual regions, in Lombardy almost all the municipalities have LHRs: in fact, through the Regional Law No. 64/1981 [28], standard LHRs were introduced for the entire territory of Lombardy, to allow all the municipalities to have a common tool with basic standards [29].

Conversely, four Italian regions are highly deficient of LHRs. In Aosta Valley, Trentino-South Tyrol and Calabria such lack is attributable to specific regional requirements: effectively, LHRs are not required if BRs have been approved by LHAs. On the other hand, for Basilicata, the survey revealed that the designers and local operators refer to texts written by experts in hygienic fields.

Finally, it is important to highlight the lack of knowledge about the existence of LHRs by competent bodies and, in most of cases, the difficulty in distinguishing local hygiene and building regulations.

In other cases, such interviews with local administra-

**Table 3**
Application and year of application of LHRs per type

| Local Health Rules | | TYPES A-B | TYPE C | TYPE D |
|---|---|---|---|---|
| Year of application | Missing year | 1% | 2% | 2% |
| | Before 1978 | 2% | 4% | 1% |
| | From 1979 to 1992 | 1% | 1% | 0% |
| | From 1993 to 2001 | 1% | 2% | 0% |
| | After 2001 | 7% | 6% | 1% |
| Application | In possession of LHRs | 12% | 14% | 5% |
| | Devoid of LHRs | 8% | 30% | 31% |

**Table 4**
Application and year of application of BRs per type

| Building Regulations | | TYPES A-B | TYPE C | TYPE D |
|---|---|---|---|---|
| Year of application | Before 1978 | 1% | 2% | 1% |
| | From 1979 to 1992 | 1% | 2% | 1% |
| | From 1993 to 2001 | 1% | 2% | 1% |
| | After 2001 | 16% | 29% | 17% |
| Application | In possession of LHRs | 18% | 35% | 20% |
| | Devoid of LHRs | 2% | 9% | 16% |

tors have suggested that different urban realities have adopted commonly the same LHR, such as in Lazio, Liguria, Lombardy, Tuscany, etc., especially for municipalities among type D.

### *Building Regulations*

From the analysis conducted on the municipalities, 73% (406 cities) are equipped with BR. In fact, as *Table 4* shows, the possession of BRs results decidedly is predominant for all the types. Although analysing partial data, the research team has found a considerable state of implementation for all the types:

- within types A-B, 104 municipalities of 111 have BR;
- within type C, 194 cities out of 242 possess BR;
- within type D, 29 urban centres of 200 have the BR.

Especially types A-B, related to the most populous cities, are almost all equipped with BRs.

Another very interesting aspect is that most of the documents (62%) have been updated documents after the Presidential Decree No. 380/2001 and, most of them, concern issues related to energy reduction and water consumption, providing useful references to improve housing liveability and healthiness [30].

At the regional level, in areas where in recent years there have been natural disasters, such as Emilia Romagna and Abruzzo, BRs have recently been upgraded in terms of local hygiene and building regulations [31, 32]. In contrast, the autonomous regions with special statute have specific regional laws for building dimensioning, safety and hygiene aspects, such as the Friuli-Venezia Giulia which refers to the Regional Law No. 44/1985 [33] and Regional Decree No. 2117/2013 [34].

In relation to the approval and implementation procedures of BRs, it is observed that only the 30% of the regulations were approved by competent bodies in hygiene and public health fields. In addition, 15% have not given any information about BR; while about 55% have not received any feedbacks, although it is expected since 1934 [12]. To note a remarkable shortage in Southern Italy because only 10% have documents approved by LHAs *(Table 5)*.

Naturally, where the approval lacks, several articles quote *"after verification and approval by the Local Health Authority"* referring all the verifications as well to the competent representatives.

### *Municipal Development Plan*

Municipal Development Plan are planning instruments which regulate the urban and construction activities within an urban centre. BRs are a component of MDPs are a component of MDPs. These tools are mandatory for all municipalities, as National Spatial Planning Law No. 1150/1942 declared in Art. 1-2, and they are supported by implementing technical standards that effectively integrate BRs and LHRs to the building scale. However, since this is a tool that works on the urban scale, it resulted very interesting to analyse and evaluate the state of implementation of it. Although this is a document that acts at the urban scale, as explained in the methodology, the survey has also been extended to the MDPs to understand the participation of LHAs in decision-making.

As emerged in *Table 6*, the survey observes that the most of municipalities (73%), adopted MDP and, among them, the majority (65%) was completed or updated within the last 15 years. Among big towns (type B), it was not possible to access the MDP.

Although it is an instrument that is related to the urban scale, from the analysis it emerges that about 20% of the documents were approved by the LHAs.

### *Data discussion*

As *Table 7* shows, all the updated LHRs and BRs data were compared for analysing the state of the art of regulations updating. Only 11% of the municipalities analysed presents local hygiene and Building Regulations updated in the last decade, including emerging regional capitals of the region Bologna (Emilia Romagna), Cagliari (Sardinia), Catanzaro (Basilicata) and Turin

**Table 5**
Local Health Authority verification and approval on BRs (compared to the total number of regulations analyzed, equal to 406)

| | Northern Italy | Central Italy | Southern Italy and islands |
|---|---|---|---|
| Approval by LHAs | 15.76% | 9.11% | 5.17% |
| No Approval by LHAs | 22.91% | 8.13% | 25.12% |
| Undefined | 4.93% | 4.43% | 4.43% |

**Table 6**
Application and year of application of MDPs per type

| Municipal development plans | | TYPES A-B | TYPE C | TYPE D |
|---|---|---|---|---|
| Year of application | Before 1978 | 1% | 1% | 0% |
| | From 1979 to 1992 | 1% | 1% | 0% |
| | From 1993 to 2001 | 1% | 1% | 1% |
| | After 2001 | 15% | 30% | 20% |
| Application | In possession of LHRs | 18% | 33% | 22% |
| | Devoid of LHRs | 2% | 11% | 14% |

**Table 7**
Updating of Local Health Rules and Building Regulations

| Data analysis | | LHRs | | |
|---|---|---|---|---|
| | | Devoid of LHRs | Updated before 2001 | Updated after 2001 [17] |
| BRs | Devoid of BRs | 23% | 1% | 2% |
| | Updated before 2001 | 8% | 3% | 2% |
| | Updated after 2001 [17] | 39% | 11% | 11% |

(Piedmont). On the contrary, data strongly underline the discrepancy between municipalities that own a BR and lack of HRs, problem which emerges in approximately 40% of the analysed municipalities.

As a consequence, it is necessary to consider the reasons for failure in updating of hygiene standards of which are primarily for the building construction, such as environmental hygiene, safety, noise, radiation, food and drink, etc. There are thriving national and regional legislations, which often make redundant municipal norms. There are three main causes for the results obtained:

- the current lack of technical competences of administrations in health and hygiene fields;
- the low social impacts of the rules laid down in the local health rules;
- a greater freedom for designers and directors in the absence of standards.

In urban realities where Building Regulations are updated, this might lean towards the first two reasons, because often the BRs make up with specific requirements to the shortcomings of LHRs [35]; conversely, even where Building Regulations are not updated, it is possible to lean towards the third option. In these areas, in fact, there is one of the strongest presence of illegal development, although several initiatives in recent years have been promoted.

## CONCLUSIONS

As already emerged in similar surveys, difficulties in accessing information and the lack of such documents on institutional websites, getting in touch with the competent offices by phone or email without any response, criticisms related to do not be able to ask for advice with competent technicians in hygiene and public health demonstrate the ineffectiveness in defining design strategies for healthy places in Italy [36]. This represents a serious problem for designers, professionals and all the actors involved in the building sector, that do not have common regulations in the Italian country. In last decades, the scenario became more complex because of the adoption of Community, National and Regional Hygiene standards that usually are described in BRs and LHRs.

Furthermore, this research work underlines that administrative division of the Italian territory is lacking a global coordination on hygiene standards (only some regions, like Lombardy, act in a different manner because many municipalities do not have specific requirements in building safety and hygiene). These are key points that explain clearly the picture of the situation emerged in this analysis [37].

If for municipalities, especially the type D ones, it is possible to identify some mitigating factors, this cannot be justified by regional administrations, only a part of them had addressed several recommendations and actions, in some cases also coercive, such as standard LHRs.

The guidelines for improving the topics, should be accounted as factors described above to ensure more instruments to act for the safety and health of people in private and public environments. Waiting for advantageous legislative interventions, the initiative to give back to BRs and LHRs their potential role can ensured at the national scale by defining performance guidelines, instead of prescriptive ones.

Recently the Italian Government is taking steps to establish a common National Building Regulation for all municipalities. It would be a regulation with a common structure for the whole country, with the ability for administrations to conform the document according to their specificities. In fact, rules and technical aspects will be provided to define interventions at urban and building scales: from dimensional characteristics, health and safety standards to accessibility criteria for the removal of architectural barriers, etc. Currently the

Government has already defined a list of 42 standard definitions, which will be attached to the model regulation [38].

Starting from the criticisms identified and for future researches, the team has expanded the investigation through the analysis of some BRs and LHRs, about five municipalities (types A and B), for each region, to verify and compare the contents (information, qualitative and quantitative data, general definitions, etc.). The analysis, which will be published soon, aims to verify the state of the art, related to the updating and/or obsolescence of LHRs and BRs, and developing useful considerations on how designers should use and apply those documents, that often present dissimilar information [39, 40].

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***Conflict of interest statement***

There are no potential conflicts of interest or any financial or personal relationships with other people or organizations that could inappropriately bias conduct and findings of this analysis.

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## REFERENCES

1. Settimo G, D'Alessandro D. European community guidelines and standards in indoor air quality: what proposals for Italy. *Epidemiol Prev* 2014;38:36-41.
2. D'Alessandro D, Raffo M. Adapting the answers to new problems of living in a changing society. *Ann Ig* 2011;23(3):267-74.
3. Hood E. Dwelling disparities: how poor housing leads to poor health. *Environ Health Perspect* 2005;113(5):A310-7.
4. Fara GM, D'Alessandro D. Population ageing: impacts on the satisfaction of social demand and medical needs. *Techne* 2015;9:21-6. DOI: 10.13128/Techne-16099
5. Capasso L, Capolongo S, Faggioli A, Petronio MG, D'Alessandro D. Do Italian housing regulations and policies protect poor people's health? *Ann Ig* 2015;27(4):688-9. DOI: 10.7416/ai.2015.2060
6. Italia. Legge 8 Giugno, n. 142. Ordinamento delle autonomie locali. *Gazzetta Ufficiale- Supplemento Ordinario* n. 135, 12 giugno 1990.
7. Capasso L, Capolongo S, Faggioli A, Petronio MG, D'Alessandro D. Living in a semi-basement in the era of floods. Italian Laws cause inequalities in health protection. *Ann Ig* 2015;27(2):202-4. DOI: 10.7416/ai.2015.2038
8. Capasso L, Basti A, Savino A, Flacco ME, Manzoli L, D'Alessandro D. Semi-basements used as dwellings: hygienic considerations and analysis of the regulations. *Ann Ig* 2014;26:3-9. DOI: 10.7416/ai.2014.1955
9. Popov VI, D'Alessandro D, Gaeta M, Capasso L. Lighting requirements of dwellings: A comparison between Russian federation and Italy. *Ann Ig* 2016;28:202-7. DOI: 10.7416/ai.2016.2098
10. Thomson H, Thomas S, Sellstrom E, Petticrew M. The health impacts of housing improvement: a systematic review of intervention studies from 1887 to 2007. *Am J Publ Health* 2009;99(Suppl. 3):S681-92.
11. Italia. Legge 20 marzo 1865, n. 2248. Legge sui lavori pubblici, Allegato F. *Gazzetta Ufficiale* n. 2248, 27 aprile 1865.
12. Italia. Regio Decreto 27 luglio 1934, n. 1265. Testo unico delle leggi sanitarie. *Gazzetta Ufficiale – Supplemento Ordinario* n. 186, 9 agosto 1934.
13. Italia. Legge 22 dicembre 1888, n. 5849. Legge per la Tutela della Igiene e della Sanità Pubblica. *Gazzetta Ufficiale – Supplemento Ordinario* n. 301, 24 dicembre 1888.
14. Italia. Legge 23 dicembre 1978, n. 833. Istituzione del servizio sanitario nazionale. *Gazzetta Ufficiale – Supplemento Ordinario* n. 360, 28 dicembre 1978.
15. Italia. Legge 23 ottobre 1992, n. 421. Delega al Governo per la razionalizzazione e la revisione delle discipline in materia di sanità, di pubblico impiego, di previdenza e di finanza territoriale. *Gazzetta Ufficiale – Supplemento Ordinario* n. 257, 31 ottobre 1992.
16. Capasso L, Schioppa FS. 150 years of hygienic requirements of dwellings in Italy. *Ann Ig* 2012;24(3):207-16.
17. Italia. Decreto del Presidente della Repubblica 6 giugno 2001, n. 380. Testo unico delle disposizioni legislative e regolamentari in materia edilizia. *Gazzetta Ufficiale - Supplemento Ordinario* n. 245, 20 ottobre 2001.
18. Fehr R, Capolongo S. Healing environment and urban health. *Epidemiol Prev* 2016;40(3-4):151-2. DOI: 10.19191/EP16.3-4.P151.080
19. Italia. Legge 17 agosto 1942, n. 1150. Legge urbanistica. *Gazzetta Ufficiale* n. 244, 6 ottobre 1942.
20. Italia. Decreto Ministeriale Sanità 5 luglio 1975. Modificazioni alle istruzioni ministeriali 20 giugno 1896, relativamente all'altezza minima ed ai requisiti igienico-sanitari principali dei locali di abitazione. *Gazzetta Ufficiale* n. 190, 18 luglio 1975.
21. Italia. Decreto Ministeriale 9 Giugno 1999. Modificazioni in materia dell'altezza minima e dei requisiti igienicosanitari principali dei locali di abitazione. *Gazzetta Ufficiale* n. 148, 26 giugno 1999.
22. Petronio MG, Amoruso R, Carletti M, *et al*. *Regolamento per l'edilizia bio-eco sostenibile*. Matera: Tipografia Publidea Policoro; 2012.
23. Signorelli C, Capolongo S, Carreri V, Fara GM. The adoption of local hygiene and building regulations and their update in a sample of 338 Italian municipalities. *Ann Ig* 1999;11(5):397-403.
24. Italia. Decreto Legge 24 giugno, n. 90. Misure urgenti per la semplificazione e la trasparenza amministrativa e per l'efficienza degli uffici giudiziari. *Gazzetta Ufficiale – Supplemento Ordinario* n. 190, 18 agosto 2014.
25. Signorelli C, Odone A, Buffoli M, Capolongo S. Building Codes and public health on both sides of the Atlantic. *J Public Health Policy* 2016;37(3):385-7. DOI: 10.1057/

s41271-016-0010-7

26. Italia. Decreto del Presidente della Repubblica 26 Agosto 1993, n. 412. Regolamento recante norme per la progettazione, l'installazione, l'esercizio e la manutenzione degli impianti termici degli edifici ai fini del contenimento dei consumi di energia, in attuazione dell'art. 4, comma 4, della legge 9 Gennaio 1991, n. 10. *Gazzetta Ufficiale – Supplemento Ordinario* n. 96, 14 ottobre 1993.
27. Capasso L, Varagnoli C, Basti A, Petronio MG, Flacco ME, Mascaro L, Manzoli L, D'Alessandro D. Exceptions to hygienic requirements of dwellings in building restoration and indemnity for abuses in Italy. *Ann Ig* 2014;26(6):553-8. DOI: 10.7416/ai.2014.2014
28. Italia. Legge Regionale 26 Ottobre 1981, n. 64. Norme per l'esercizio delle funzioni in materia di igiene e sanità pubblica, per la tutela della salute nei luoghi di lavoro, per l'organizzazione ed il funzionamento dei servizi veterinari e dei presidi multizonali di igiene e prevenzione. *Bollettino Ufficiale Regione Lombardia-Supplemento Ordinario* n. 43, 28 ottobre 1981.
29. Coppola L, Ripamonti E, Cereda D, Gelmi G, Pirrone L, Rebecchi A. 2015-2018 Regional Prevention Plan of Lombardy (Northern Italy) and sedentary prevention: a cross-sectional strategy to develop evidence-based programmes. *Epidemiol Prev* 2016;40(3-4):243-8. DOI: 10.19191/EP16.3-4.P243.091
30. Petronio MG, Battisti F. Definition and adoption of a Building Regulation based on biological and ecological sustainability in the Local Health Authority 11 of Empoli (Tuscany Region, Central Italy): strengths and areas for improvement. *Epidemiol Prev* 2016;40(2):140-4. DOI: 10.19191/EP16.2.P140.070
31. Polesani L, Cocuzza S, Nachiero D. Earthquakes and healthcare. Considerations and proposals for improving seismic safety of hospitals. *Ann Ig* 2012;24(5):389-96.
32. Signorelli C, Capolongo S, Buffoli M, et al. Italian Society of Hygiene (SItI) recommendations for a healthy, safe and sustainable housing. *Epidemiol Prev* 2016;40(3-4):265-70. DOI: 10.19191/EP16.3-4.P265.094
33. Italia. Legge Regionale (Regione Autonoma Friuli Venezia Giulia) 23 agosto 1985, n. 44. Altezze minime e principali requisiti igienico – sanitari dei locali adibiti ad abitazione, uffici pubblici e privati ed alberghi. *Bollettino Ufficiale Regionale* n. 087, 26 agosto 1985.
34. Italia. Deliberazione della Giunta Regionale (Regione Veneto) 19 novembre 2013, n. 2117. PAR FSC 2007-2013. Attuazione Asse 5 Sviluppo locale - Linea di intervento 5.3: Riqualificazione dei centri urbani e della loro capacità di servizio. Individuazione degli interventi finanziabili ex DGR n. 736/2013. *Bollettino Ufficiale Regionale* n. 109, 17 dicembre 2013.
35. Lawrence RJ. Housing and health: from interdisciplinary principles to transdisciplinary research and practice. *Futures* 2004;36:487-502.
36. Capolongo S. Architecture as a Generator of Health and Well-being. *Journal of public health research* 2014;3(1):276. DOI: 10.4081/jphr.2014.276
37. Faggioli A, Capasso L. Inconsistencies between building regulations in force in Italy for indoor environment and wellness factors. *Ann Ig* 2015;27(1):74-81. DOI: 10.7416/ai.2015.2025
38. Italia. Presidenza del Consiglio dei Ministri Conferenza Unificata. Intesa 20 ottobre 2016. Intesa, ai sensi dell'articolo 8, comma 6, della legge 5 giugno 2003, n. 131, tra il Governo, le Regioni e i Comuni concernente l'adozione del regolamento edilizio-tipo di cui all'articolo 4, comma 1-sexies del decreto del Presidente della Repubblica 6 giugno 2001, n. 380. *Gazzetta Ufficiale – Serie Generale* n. 268, 11 novembre 2016.
39. Kent J, Thompson S. Health and the built environment: exploring foundations for a new interdisciplinary profession. *J Environ Public Health* 2012:1-10. DOI: 10.1155/2012/958175
40. Chauvin J, Pauls J, Strobl L. Building codes: An often overlooked determinant of health. *J Public Health Policy* 2016;37(2):136-48. DOI: 10.1057/jphp.2016.5