

Waiting time for outpatient specialist care in Lombardy Region: proposal of a new checklist for evaluating accessibility of information on websites of public health agencies and healthcare structures

Pietro MAGNONI¹, Davide CARNEVALI¹, Laura CAVAZZANA¹, Niccolò PRINCIPI¹, Ludovico GRIMOLDI¹, Silvana CASTALDI^{2,3}.

¹ *Post Graduate School in Public Health, Department of Biomedical Sciences for Health, University of Milan, Italy;* ² *Department of Biomedical Sciences for Health, University of Milan, Italy;* ³ *Quality Unit, Fondazione IRCCS “Ca’ Granda” Ospedale Maggiore Policlinico, Milan, Italy.*

Correspondence: Silvana Castaldi, Department of Biomedical Sciences for Health, University of Milan, Via Pascal 36, 20133, Milan, Italy. E-mail: silvana.castaldi@unimi.it

Word count (text only): 3925

ABSTRACT

Introduction and aim. Waiting time for outpatient specialist care is an ever-present problem for all Countries with an universalistic healthcare system granting advanced levels of care. The latest Italian National Plan for Government of Waiting Lists (2010-2012) states that information regarding waiting times must be available on all websites belonging to public health agencies and healthcare structures. The aim of the present qualitative study is to evaluate the accessibility and quality of such information on websites of all public health agencies and healthcare structures in Lombardy Region.

Materials and methods. A checklist was designed *ad hoc* by the authors for the present analysis. The checklist includes 30 items scored 0-1 and grouped in five categories: Accessibility, Architecture, Content, Interactivity, Utility and additional information. All websites belonging to 8 health agencies (ATS), 27 public hospitals (ASST), 4 research and teaching hospitals (IRCCS) were analyzed in June 2018. One public hospital was excluded from analysis as it did not provide a unified website with a unique identity for the whole structure.

Results. ATS websites obtained a higher median total score than ASST/IRCCS (19.5, range 18-23 vs 15, range 9-21). When considering single categories, the median sub-total scores of ATS websites were all higher than those of ASST/IRCCS, except for Utility. In all, 29/38 websites (76.3%) exposed their waiting times directly, among which three did not update data at least monthly as required by current legislation. Only 47.4% of websites provided information aimed at raising awareness and tackling no-shows. None of the websites offered a dedicated section in English. Four out of 38 (10.5%) explained the role of private practice in public structures when maximum waiting times are exceeded.

Conclusion. Until full functionality of the regional booking website is achieved, the lack of exposition of waiting times on all websites of ATS, ASST and IRCCS appears to be a relevant issue. There is also little empowering information that may help tackle waiting times themselves. These results warrant further efforts to improve the quality of websites and increase transparency for the citizens.

INTRODUCTION

Waiting time for an outpatient specialist service is defined as the time elapsed between the booking of an appointment and the actual carrying out of the specialist visit or examination. Waiting lists for health services arise whenever an imbalance between supply and demand is generated by lack or unwise use of resources, suboptimal outpatient service organization, or extremely high demand ⁽¹⁾. Multiple causes for the growing demand of health services in our society may be identified: continuous innovations and improvement in technologies for diagnosis and treatment; progressive population ageing and high prevalence of chronic diseases; increasing scientific knowledge and awareness of citizens about their health status ⁽²⁾. In a universalistic healthcare system, citizens tend to incur into moral hazard and raise their demand beyond considerations of appropriateness and effectiveness ⁽³⁾. As such, waiting lists and related high waiting times are an ever-present problem for all Countries with a universalistic healthcare system granting advanced levels of care, and Italy makes no exception. The Italian Ministry of Health describes waiting lists as “one of the most critical issues of modern healthcare systems, as it compromises accessibility and availability of health services” ⁽⁴⁾.

Many regulatory measures have been undertaken over the past twenty years. National Plans have been published as a result of agreements between the Italian Government and all Regions. They define guidelines and set minimum requirements for all Regions to fulfill. Nonetheless, because of the regionalized arrangement of the Italian National Health Service, much autonomy is granted to Regions in defining their own Regional Plans. The latest update of the triennial Italian National Plan for Government of Waiting Lists (*Piano Nazionale di Governo delle Liste di Attesa*, PNGLA) dates to the period 2010-2012 and bears four major implications ⁽⁵⁾.

First, it defines a list of 43 outpatient services for which a maximum waiting time limit ought to be respected for at least 90% of appointments. Different thresholds are defined depending on priority classes. These must be indicated in the prescription according to patient needs: U, “urgent”, to be

guaranteed within 72 hours of request; B, “brief”, to be guaranteed within 10 days of request; D, “deferrable”, to be guaranteed within 30 days for specialist visits and 60 days for instrumental examinations; P, “programmable”, for which no limit is set.

Secondly, it encourages the purchase of private practice performances in public health structures (*intramoenia*) as a tool for list government. More importantly, it states that if waiting times for public healthcare services exceed maximum limits in the desired public provider and in all public providers over the whole area of the health agency, citizens may receive the services from the provider they first addressed under a pay-for-performance regime with the provider being charged of all additional costs other than the ticket.

Thirdly, it defines modalities for monitoring waiting times for first-time access services with priority classes B and D, by means of dedicated information flows. Monitoring must be performed both *ex post* with a retrospective collection of the effective time elapsed between booking and provision of the service (i.e. the real “appointment delay”) and *ex ante* via prospective evaluation on predetermined days of the next available empty slot in booking schedules.

Fourthly, it states the need to systematically the presence of data regarding waiting lists and waiting times on every website belonging to public health agencies and healthcare structures, in order to guarantee transparency and availability to citizens. The Plan establishes that such information “should be given in dedicated website sections and be easily accessible”.

Lombardy Region implemented the PNGLA with its own Regional Plan for Government of Waiting Lists (*Piano Regionale per il Governo delle Liste di Attesa*, PRGLA), adopted with Deliberation of the Regional Council (*Deliberazione della Giunta Regionale*, DGR) n° 1775/2011 ⁽⁶⁾. Further modifications were introduced in subsequent years with DGR n° 3993/2015 ⁽⁷⁾ and DGR n° 7766/2018 ⁽⁸⁾. Briefly, Lombardy Region accepted all indications set by the PNGLA, with some distinctive features: a) a higher goal was set so that maximum waiting time limits ought to be guaranteed for at

least 95% of appointments compared to 90% set by the PNGLA; b) a project called *Ambulatori Aperti* (literally, “Open Clinics”) was launched with DGR n° 1846/2014 ⁽⁹⁾. The project aims at granting citizens variable extra opening times for outpatient specialist care in accredited public and private structures, late in the evening or during bank holidays and days before bank holidays; c) a regional information flow called MOSA (*Monitoraggio Offerta Sanitaria Ambulatoriale*, “monitoring of outpatient healthcare service provision”) was instituted with DGR n° 2989/2014 ⁽¹⁰⁾ and launched in 2015. This flow gathers data from schedules of all accredited public and private providers in order to uniform information about waiting time for healthcare services and guarantee visibility and transparency of the whole regional offer to citizens. Fulfilling this goal requires transparent exposition of all schedules to the MOSA by providers with no exception. The creation of this flow allowed for the opening of a dedicated regional booking website in 2017. The website gives homogeneous information about the whole offer that would be updated daily when it will be operative at full capacity. The website provides the first five available empty slots for each outpatient care service in all regional accredited public and private structures and allows users to proceed with the booking if they have the medical prescription; d) with regard to website monitoring, the latest DGR (2018) promotes transparent and appropriate publication of information and further explicitates the need to “provide information about the topic of waiting lists, the whole organization of healthcare service supply, its accessibility, regulatory and organizational innovations and characteristics and conditions of service provision”^x. As such, accessibility and transparency of information on websites represents a preliminary tool in order to allow citizens to make conscious choices when addressing the Regional Health Service for their health needs.

With the reformation produced by the Regional Law n° 23/2015, the welfare system of Lombardy Region is now reorganized into eight health agencies (*Agenzie di Tutela della Salute*, ATS), dedicated to programming and negotiation of health services, 27 public hospitals (*Aziende Socio-Sanitarie*

Territoriali, ASST) and four research and teaching hospitals (*Istituti di Ricovero e Cura a Carattere Scientifico*, IRCCS) granting provision of health services (Figure 1) ⁽¹¹⁾.

Although the importance of this aspect has been stressed on multiple occasions, studies assessing the quality of website sections dedicated to waiting times are lacking to date. The present qualitative study aims at evaluating the presence, accessibility and quality of information about waiting times on websites of all public health agencies and healthcare structures in Lombardy Region. Hopefully, this will serve as a motivation for improvement and prompt interventions by the agencies and structures.

MATERIALS AND METHODS

In the present descriptive study, the assessment of website sections dedicated to waiting times for outpatient specialist care was made by means of a newly designed checklist. The checklist was arranged by the authors using major literature references with regard to evaluation of quality of websites, both in healthcare and commercial settings ⁽¹²⁻¹⁴⁾.

The checklist is composed of thirty items equally distributed into five categories: a) accessibility; b) website architecture; c) contents, evaluated in terms of presence, thoroughness, frequency of updating and quality of information; d) interactivity and user-friendliness in web functionalities; e) utility and additional features for citizens. All items are scored 0/1. The full checklist with thorough explanation of item definitions and scoring criteria can be found in Table 1.

The analysis of websites belonging to all agencies (8 ATS) and public hospitals (27 ASST, 4 IRCCS) was performed independently by five trained researchers in June 2018. Definitive scores for each item were assigned based on modal values among the five investigators. Items assessing accessibility and availability of websites were scored assuming that the average user has minimal technical requirements and navigation skills. With this regard, some standards were chosen according to prevalence of use in the general population: use of Google as a web search engine; use of Safari and Google Chrome as

browsers for the evaluation of accessibility via mobile devices with iOS and Android operating systems, respectively.

RESULTS

The analysis yielded results for 38 out of 39 websites. One public hospital was excluded because of a serious lack of identity that hampered the present evaluation. At the time of our analysis, its website had a formal homepage whose sole function was to redirect to the independent websites of the its two structures.

With the application of our checklist, scores obtained by ATS, ASST and IRCCS websites ranged between 9 and 23 overall (Figure 2). The median score was 16, with an IQR of 3.75. When analyzing subcategories, accessibility from Google was considered positively for almost all websites (94.7%). Most websites (55.3%) were not optimized for use on mobile devices, thus limiting accessibility. Internal search features were found to be less functional, as they were absent or useless in 14 out of 38 websites. Only 36.9% of websites had the section clearly visible and accessible from homepage. None of the websites offered a dedicated section in English thus limiting access to non-Italian speaking users. Additional aids (mostly size and color contrast change) were provided by 17 websites (44.7%).

Webpage architecture was found to be satisfactory overall. Although 14 out of 38 websites were judged to have poorly designed and confusing page layout, the other parameters (color scheme, page rendering, headings and titles) were considered appropriate for most websites. Nonetheless, key contents were poorly outlined in more than half of cases. More importantly, not all websites showed a clearly defined brand identity, that was missing in 4 cases (10.5%).

As for content, most websites provided at least basic information about waiting times and government of waiting lists (76.3%). However, only 20 out of 29 gave this piece of information in a linguistic register which was judged as easily understandable. In all, 29 out of 38 websites (76.3%) exposed their

waiting times directly, but three of them did not update data at least monthly as required by current legislation. Two websites on the other hand (5.3%) were most successful and updated their data at least weekly. What mostly lacked was data quality, as most websites (84.2%) provided waiting times as just downloadable tables that could not be filtered and proved hard to read.

Interactivity was found to be rather weak. Only six out of 38 websites offered a filter functionality when displaying waiting times and adopted a user-friendly approach to interactivity. It should be emphasized that 8 out of 38 websites offered a feedback functionality, thus allowing the user to ask for questions or judge the content. Links were evident and working in most cases, although it should be underlined that 15.8% of websites contained expired and non-functioning links. Also, seven websites did not warn the user about elements that started unintended download of documents when clicked on.

Not all websites reported information about booking or a direct reference to their booking section, which lack in 39.5% of cases. Further information about providers was also lacking on 23.7% of websites. Less than half provided a link to the Regional booking website and less than half gave information aimed at raising awareness and tackling no-shows. Information about the “Ambulatori Aperti” project was missing in 71.1% of cases, and only four out of 38 (10.5%) explained the role of *intramoenia* when maximum waiting times are exceeded.

ATS websites obtained a higher median total score than ASST/IRCCS (19.5, IQR 4 vs 15, IQR 3.75). When considering single categories, the median subtotal scores of ATS websites were still generally higher than those of ASST/IRCCS. The only exception was Utility, where ASST/IRCCS obtained a higher median score than ATS (Table 2, Figure 3). The proportion of websites scoring positively was higher among ATS than ASST/IRCCS for most items (Table 3). This was especially true for “accessibility from homepage” (8/8 vs 6/30), “key contents” (8/8 vs 10/30), “page layout” (8/8 vs 16/30), “linguistic register (7/8 vs 13/30), “data quality”, “user-friendliness” and “filter” (all 6/8 vs

0/30). In all territories, the ATS website scored better than its related ASST/IRCCS. Kiviat graphs offer a graphical comparison of scores obtained by each ATS/ASST/IRCCS website per category (Figure 4).

DISCUSSION

High waiting times and related long waiting lists are a relevant public health issue in Italy. Exceeding maximum waiting times for outpatient specialist care has a negative impact on citizens' satisfaction and their perception of healthcare system's quality and functioning ⁽¹⁵⁻¹⁹⁾.

Many successful strategies for government of waiting lists rely on effective and transparent communication to citizens and patients. Websites should grant ready access to complete information about waiting times for outpatient specialist care and booking modalities. Nowadays, information technology is a widespread tool across people of all ages. The analysis performed by the National Institute of Statistics (Istat) in 2016 confirmed that approximately 50% of people aged > 50 years look for health information online and change their behaviors based on their findings. This rate seems to be even a little higher in Lombardy Region and is steadily increasing because of progress in information and communication technologies and concurrent increase in citizens' needs and expectations ⁽²⁰⁾. The potential impact of Internet use for health purposes may represent either a threat or an advantage for users. Healthcare websites could improve the quality of service and become an instrument for health institutions to spread a large amount of information on the services they provide and how to access them. Therefore, a well-structured website with an accessible and interactive interface may effectively gain patients' confidence and play a major role for healthcare providers ⁽²¹⁾.

The present study conducted to evaluate accessibility, architecture, content, interactivity and utility of sections dedicated to waiting times for outpatient specialist care on websites of all public health agencies and healthcare structures in Lombardy Region yields some relevant findings. Overall, it must

be acknowledged that a large investment has been made on this kind of technology to allow citizens to acquire needed information and make conscious choices.

For an hospital, a very serious lack of identity did not allow its inclusion in the analysis. Indeed, the recent reorganization of the welfare system in Lombardy Region established by the Regional Law n° 23/2015 met many difficulties in its implementation, especially when very different and independent healthcare structures were fused as a single ASST.

A similar situation, albeit less incapacitating for the analysis, was found for ATS Val Padana. The agency has a unified website with a section dedicated to waiting times. However, this section forks into two links, redirecting to waiting times for former ASL Mantova and ASL Cremona. The site including information about Mantova now has the brand of ATS Val Padana and was considered for the present analysis. Nonetheless, information about Cremona is indeed separated from the rest, and although this flaw found no direct counterpart in the total score for the ATS, we would remark this as a serious problem. Nearly three years have passed since the reformation and offering a unified answer to citizens expecting information about the ATS territory as a whole should be considered mandatory.

Our analysis shows that the section dedicated to waiting times is quite easily accessible for most of the websites (via home page, internal search function or external search engine). In all ATS websites it is clearly identifiable and accessible from the homepage via banner or link with adequate visibility and font size. Regarding ASST/IRCCS, in 80% of their websites the section dedicated to waiting times cannot be accessed directly from the homepage and is only reachable within two or three clicks via related sections, i.e. “Booking” or “Transparent Administration”. This may be explained by the primary role of these structures as providers of health services.

Accessibility from mobile devices remains suboptimal at present. Less than half of websites have a mobile version or are optimized for visualization on mobile devices. This aspect warrants a particular

attention and rapid improvements, considering that mobile phones are now more frequently used by the elderly than PCs or laptops ^(22,23).

Granting access to information for people with disabilities is both a normative requirement for public administrations and a preliminary basis to improve quality of web communication ⁽²⁴⁾. For this purpose, websites may comply with Law n° 4/2004 ⁽²⁵⁾, national guidelines ⁽²⁶⁾ and international standards ⁽²⁷⁾.

Considering these as basic and mandatory requirements, the authors chose to evaluate the presence of additional visual/audio aids aimed at granting comfort and easiness of use for most citizens.

The latest nationwide inquiry assessing the presence of information about waiting times on public healthcare websites was made by the Ministry of Health in 2010. At that time, only 75% of websites in Lombardy Region presented information about waiting times, with a great discrepancy (100% vs 38%) between local health agencies (formerly called ASL now ATS) and public hospitals (formerly called AO and now ASST) ⁽²⁸⁾. Compared to those findings, all websites of public health agencies and healthcare structures now have a dedicated section and provide information about waiting times either directly or indirectly via link to hierarchically superior websites.

However, only 29/38 websites expose their waiting times directly. Six ATS publish data about their own waiting times for outpatient specialist care, whereas the other two only redirect to the regional booking site where information from all structures is gathered via the MOSA flow. From a certain perspective, this may represent the best choice in the long term and was considered positively by scoring the appropriate item in the Utility section. Nonetheless, at the time of the present analysis, the MOSA flow and the regional booking website are not fully operative because of missing information, unpublished schedules and lack of real-time updates. Considering that current legislation imposes exposition of waiting times on all websites, indirect exposition via link to the MOSA flow cannot be considered sufficient and was scored as 0. Hopefully, the full functionality of the omni-comprehensive Regional website will soon allow to fully achieve its potential. This will oblige all agencies and health

structures to expose their waiting times to the MOSA flow and to provide a clearly visible and accessible link on their websites. From this perspective, 20 out of 38 websites do not provide the updated link to the regional booking website at present, thus showing much room for improvement. The same reasoning applies to ASST/IRCCS, for which redirecting to the website of their own ATS instead of displaying information about their respective territories cannot be strictly considered as a shortcoming but was still scored as 0.

Among websites directly exposing waiting times for outpatient specialist care, three do not update their data at least monthly, as per current legislation. On the other hand, two websites (ATS Pavia, ASST Lecco) were rewarded for updating their data weekly. The website of ATS Insubria should receive a honorable mention for updating data fortnightly. Of course, these update rates are not enough to keep up with the rapid changes and fast dynamics of booking for outpatient specialist services. As such, they can only be considered positively so long as we are waiting for a real-time updating that will only be achieved by optimizing the MOSA flow.

Eight websites have decided to implement a contact form or a customer satisfaction survey tool. Although these functions are frequently used in English-speaking countries, they have only recently made their appearance on websites of Italian public administrations, which is to be valued as a plus.

In 60.5% of website sections dedicated to waiting times, either thorough information about booking modalities is given directly or a link to the “Booking” section is evident. This appears to be extremely useful for the customer by following an information-to-action logical flow. Information about the “Ambulatori Aperti” project, on the other hand, is generally scarce on most websites (27/38), although evaluation of this item is distorted by whether this kind of extra service has actually been implemented in the respective territories.

Only 18 out of 38 websites provide information about demand government and explain the importance of avoiding no-shows by cancelling previously booked appointments when appropriate. More

importantly, only four websites explain the role of *intramoenia* and inform users that if waiting times for public healthcare services exceed maximum limits over the whole ATS territory, they may receive the services from public provider they first addressed under a pay-for-performance regime. This remarks the need to guarantee accuracy, transparency and completeness of information empowering all citizens.

Several considerations may be made about the validity of the present study. First, we used a newly designed checklist that has not been validated yet. Our analysis was performed to evaluate only sections dedicated to waiting times and not the whole websites. To our knowledge, no dedicated tool for this kind of analysis has been proposed in the literature. Nonetheless, we adapted previously published models for evaluation of websites to the aims of the present study. The heuristic model proposed by Molich & Nielsen is perhaps the best known and used to date ^(29,30). This tool has undergone numerous revisions over the years up to the recent 2012 evidence-based heuristics by Petrie & Power. It was developed for evaluation of websites with a high level of interactivity but has recently been taken into consideration for the evaluation of healthcare websites, proving to be equally valid ⁽³¹⁾. Secondly, a unique checklist was designed to evaluate both ATS and ASST/IRCCS. This obviously cannot do justice to the considerable differences in terms of mission, organization and activity between the two kind of institutions that directly impact on aims, needs and expectations. As a result, evaluation of some items ended up being disbalanced in favor of one group or the other. Lastly, we acknowledge that the choice of quantity and nature of items, as well as their scoring, is purely subjective. In order to reduce this subjectivity, the five researchers carried out their own evaluation independently. Results were then compared, and scoring was attributed based on modal values for each item. We think that the chosen items could reflect the citizens' perspective by giving a realistic snapshot of the main difficulties that an average user may have to face. It should be outlined that these are mostly

suggestions and by no means an obligation for health agencies and health structures. As such, the intent is not to criticize but just to offer a chance for improvement to maximize benefit for the citizens.

CONCLUSION

Online exposition of waiting time for outpatient specialist care is a priority for public health agencies and healthcare structures that has been underlined, in Italy, by national and regional regulations published over the past decades. Although many improvements have been made, the present analysis suggests that more attention should be paid to modalities and timing of publication of waiting times on websites of public health agencies and healthcare structures in Lombardy Region. Until full functionality of the regional booking website is achieved, the lack of exposition of waiting times on all websites of ATS, ASST and IRCCS appears to be a relevant issue. There is also little empowering information that may help govern waiting lists themselves. These results warrant further efforts to improve the quality of websites and increase transparency for the citizens.

REFERENCES

1. Siciliani L. Does more choice reduce waiting times? *Health Econ* 2005; 14 (1): 17-23.
2. Castaldi S. Liste di attesa: strumenti di controllo della domanda sanitaria o artefici di disuguaglianza nell'accesso alle cure? *Politiche Sanitarie* 2009; 10 (4): 243-247.
3. Siciliani L, Moran V, Borowitz M. Measuring and comparing health care waiting times in OECD countries. *Health Policy* 2014; 118 (3): 292-303.
4. Ministero della Salute. Le risposte attuali del Servizio Sanitario Nazionale, Capitolo 7. "Sistema di valutazione dell'assistenza del Servizio Sanitario Nazionale" (2011).
5. Ministero della Salute. Piano Nazionale di Governo delle Liste di Attesa (PNGLA) 2010-2012.
6. Regione Lombardia. Deliberazione della Giunta Regionale n° IX/1775 // 24/05/2011 – Recepimento dell'Intesa tra il Governo, le Regioni e le Province autonome di Trento e di Bolzano sul Piano Nazionale di Governo delle Liste di Attesa per il triennio 2010-2012.
7. Regione Lombardia. Deliberazione della Giunta Regionale n° X/3993 // 04/08/2015 – Ulteriori determinazioni in ordine alla gestione del Servizio Sanitario Regionale per l'esercizio 2015.
8. Regione Lombardia. Deliberazione della Giunta Regionale n° X/7766 // 17/01/2018 – Tempi d'attesa per le prestazioni di specialistica ambulatoriale: stato di attuazione delle politiche regionali ed indirizzi di sistema per l'ulteriore contenimento dei tempi di attesa.
9. Regione Lombardia. Deliberazione della Giunta Regionale n° X/1846 // 16/05/2014 – Sviluppo di modelli per potenziare l'accessibilità ai servizi di specialistica ambulatoriale in orari ed in giornate più favorevoli ai soggetti impegnati in attività lavorative.
10. Regione Lombardia. Deliberazione della Giunta Regionale n° X/2989 // 23/12/2014 – Determinazioni in ordine alla gestione del Servizio Socio Sanitario Regionale per l'esercizio 2015.

11. Regione Lombardia. Legge Regionale n° 23 // 11/08/2015 – Evoluzione del sistema sociosanitario lombardo: modifiche al Titolo I e al Titolo II della legge regionale 30 dicembre 2009, n. 33 (Testo unico delle leggi regionali in materia di sanità).
12. Mich L, Franch M. Un modello per la valutazione dei siti web. Università di Trento - Dipartimento di Informatica e Studi Aziendali (2000).
13. Maifredi G, Orizio G, Bressanelli M, et al. Italian hospitals on the web: a cross-sectional analysis of official websites. BMC Med Inform Decis Mak 2010;10:17.
14. Devine T, Broderick J, Harris LM, *et al.* Making Quality Health Websites a National Public Health Priority: Toward Quality Standards. J Med Internet Res 2016; 18 (8): e211, 1-11.
15. EURISPES, ENPAM. Il termometro della salute - 1° Rapporto sul sistema sanitario. Minerva Edizioni, Bologna (2018).
16. ISTAT. La situazione del Paese – Rapporto Annuale 2015.
17. Quaderni del Ministero della Salute. Cittadini e salute: la soddisfazione degli Italiani per la sanità, n° 5, settembre-ottobre 2010.
18. VII Rapporto RBM – Censis sulla sanità pubblica, privata e intermediata. Il futuro del Sistema Sanitario in Italia tra universalismo, nuovi bisogni di cura e sostenibilità (2017).
19. Federconsumatori, Forum Ania Consumatori. Costi ed efficacia del Servizio Sanitario Nazionale (2017).
20. Sistema Statistico Nazionale - Istituto Nazionale Di Statistica. Indagine multiscopo sulle famiglie: aspetti della vita quotidiana (2016). <http://dati.istat.it/index.aspx?QueryId=23020#>
21. Usman M, Ashraf M, Ghazali M. The Usability of Healthcare Websites - How they were Assessed? A Systematic Literature Review on the Usability Evaluation. RRJES 2017; 3 (2): 20-26.

22. Olson KE, O'Brien MA, Rogers WA, *et al.* Diffusion of Technology: Frequency of Use for Younger and Older Adults. *Ageing Int* 2011; 36 (1): 123-145
23. 14° Rapporto Censis - Ucsi sulla comunicazione: I media e il nuovo immaginario collettivo (2017).
24. Chiadò Piat S, Gianino MM, Icardi G, *et al.* Visibility, accessibility and quality of Italian public health institutional websites. *JPH* 2010; 7 (2): 102-108.
25. Legge n° 4 // 09/01/2004 – Disposizioni per favorire l'accesso dei soggetti disabili agli strumenti informatici.
26. Agenzia per l'Italia Digitale. Guida pratica per la creazione di un documento accessibile (2017). https://www.agid.gov.it/sites/default/files/repository_files/linee_guida/guida_pratica_creazione_word_accessibile_2.pdf
27. ISO/IEC 40500:2012 (W3C). Information technology – W3C Web Content Accessibility Guidelines (WCAG) 2.0. <https://www.iso.org/standard/58625.html>
28. Ministero della Salute. 4° Rapporto nazionale sull'utilizzo di Internet quale strumento di comunicazione dei dati su tempi di attesa nei siti web delle Regioni e P.A. e delle strutture del Servizio Sanitario Nazionale. Roma (2011).
29. Nielsen J, Molich R. Heuristic evaluation of user interfaces. *Proc. CHI* 1990; 249-256.
30. Hasan L, Abuelrub E. Assessing the quality of web sites. *Applied Computing and Informatics*. 2011;9:11-29.
31. Petrie H, Power C. What Do Users Really Care About? A Comparison of Usability Problems Found by Users and Experts on Highly Interactive Websites. *Proc. CHI* 2012; 2107-2116.

FIGURE LEGENDS



ATS Bergamo

- ASST Bergamo Ovest
- ASST Bergamo Est
- ASST Papa Giovanni XXIII

ATS Insubria

- ASST Sette Laghi
- ASST Valle Olona
- ASST Lariana

ATS Montagna

- ASST Valtellina e Alto Lario
- ASST Valcamonica

ATS Brescia

- ASST Spedali Civili di Brescia
- ASST Franciacorta
- ASST Garda

ATS Città Metropolitana di Milano

- IRCCS Istituto nazionale dei Tumori
- IRCCS Istituto Neurologico Carlo Besta
- IRCCS Ospedale Policlinico di Milano
- ASST Grande Ospedale Metropolitano Niguarda
- ASST Santi Paolo e Carlo
- ASST Fatebenefratelli Sacco
- ASST Centro Specialistico Ortopedico Traumatologico Gaetano Pini/CTO
- ASST Ovest Milanese
- ASST Rhodense
- ASST Nord Milano
- ASST Melegnano e della Martesana

ATS Pavia

- IRCCS Policlinico San Matteo
- ASST Pavia

ATS Brianza

- ASST Lecco
- ASST Monza
- ASST Vimercate

ATS Val Padana

- ASST Cremona
- ASST Mantova
- ASST Crema

Figure 1. Configuration of the welfare system in Lombardy Region after the reformation produced by the Regional Law n° 23/2015.

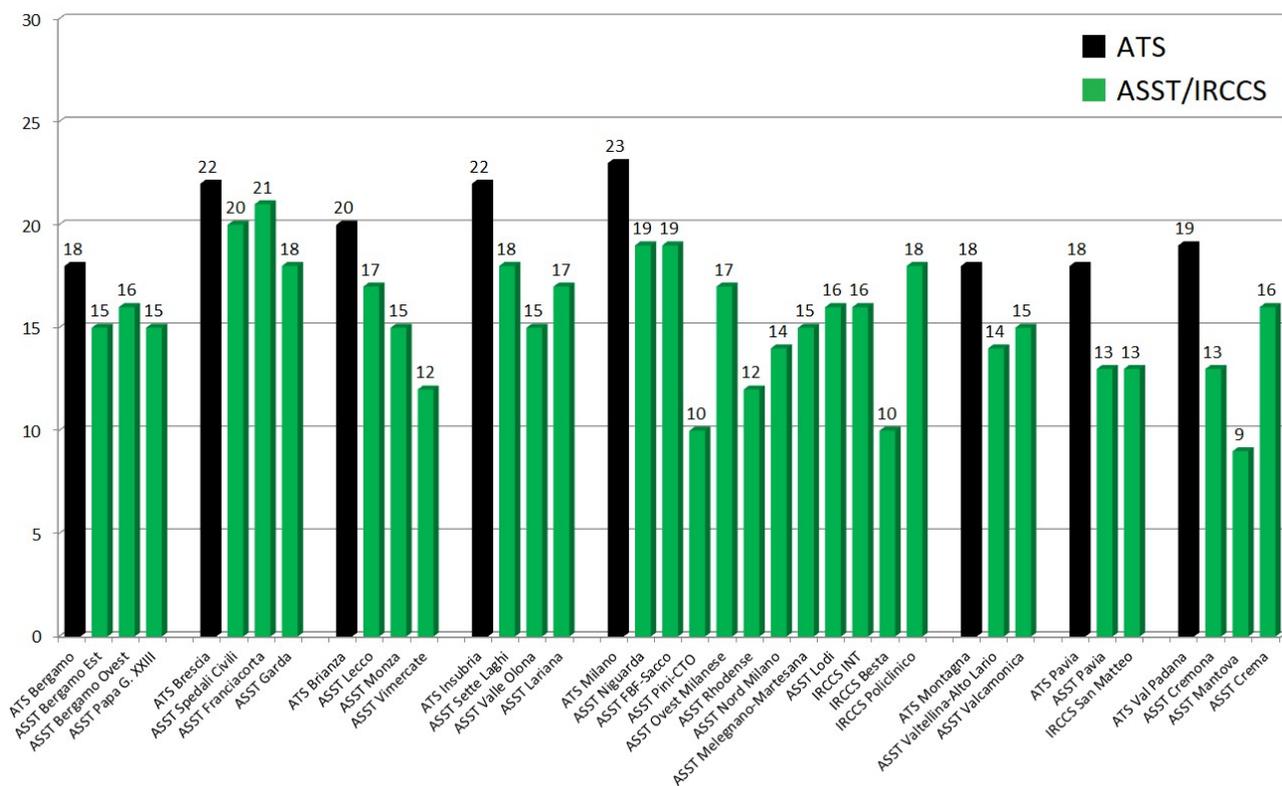


Figure 2. Bar chart reporting the total score for every website. The highest score was 23 (ATS Milano), the lowest was 9 (ASST Mantova).

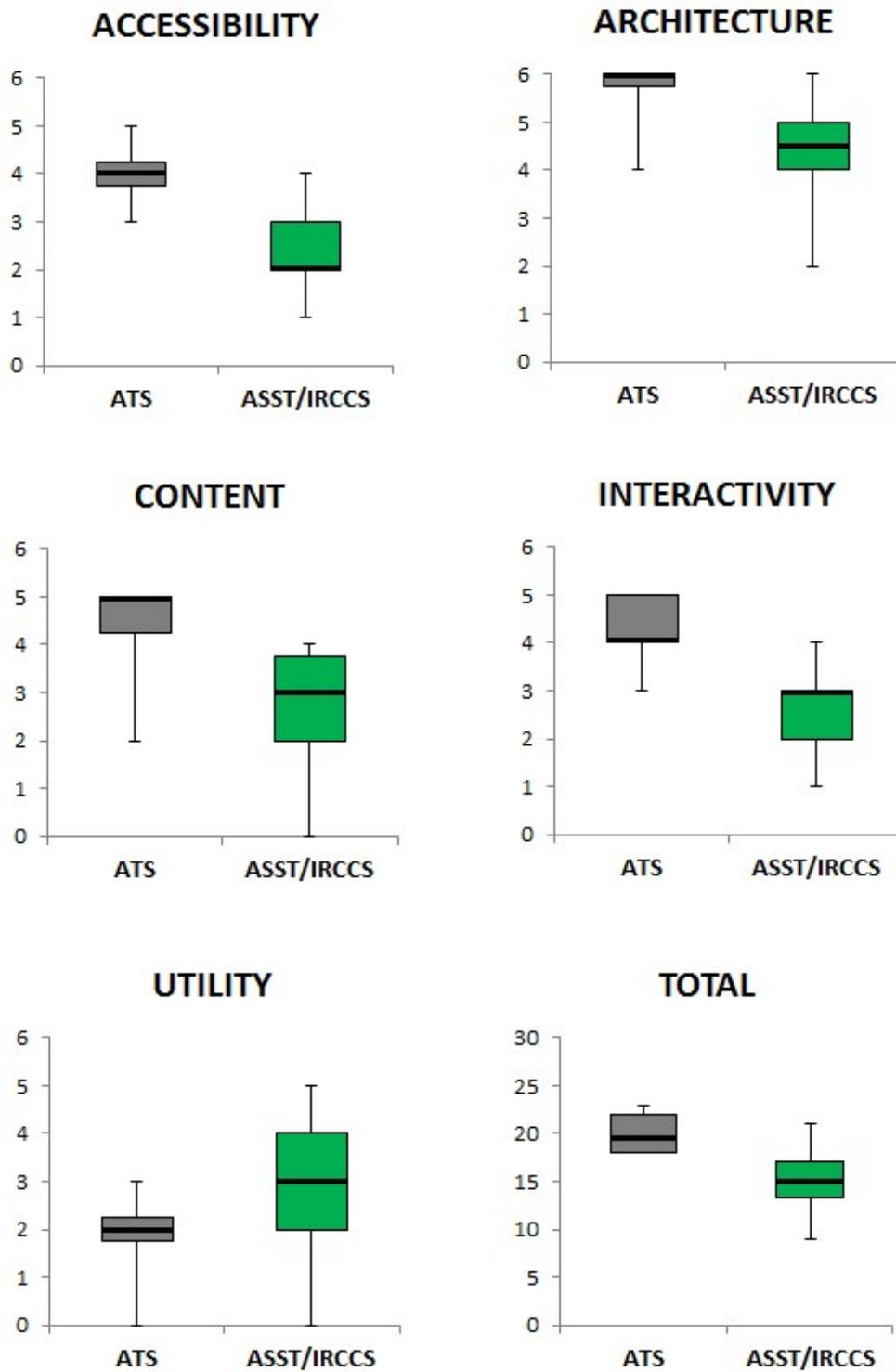


Figure 3. Box-and-whisker plots illustrating the distribution of sub-total and total scores for ATS and ASST/IRCCS websites.

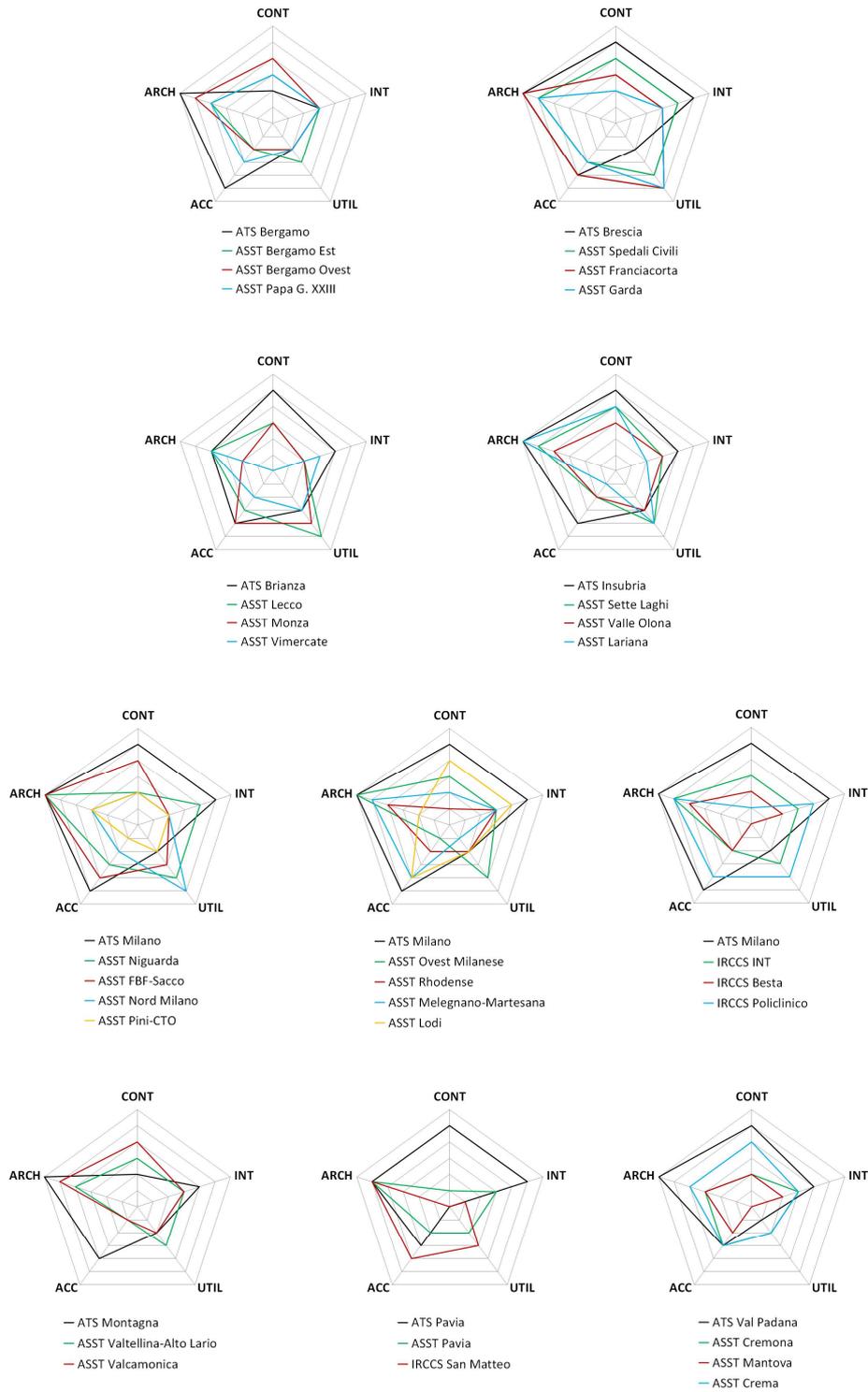


Figure 4. Kiviat graphs illustrating the results for every website in each category. ATS websites were paired with their respective ASST/IRCCS (the graph dedicated to ATS Milano was split in three due to the large amount of healthcare structures).

TABLES

Table 1. Full checklist with item explanation and scoring criteria.

CATEGORY	ITEM	EXPLANATION	SCORE
1. Accessibility	1.1 External search engine	The section dedicated to waiting times is readily available in its most updated version via research with the most commonly used web search engine (Google). If a search is performed with the query “(ATS/ASST/IRCCS name) AND (waiting OR waiting lists OR waiting times)”, an appropriate result will appear among the first five results.	1
	1.2 Mobile devices	Either a mobile version of the website is available, or the website is optimized for visualization on mobile devices.	1
	1.3 Homepage	The section dedicated to waiting times is clearly identifiable and accessible from the website homepage via banner or link with adequate visibility and font size.	1
	1.4 Internal search feature	The website provides a search feature, and the search feature is functional. If a search is performed with the query “waiting OR waiting lists OR waiting times”, a link to the section dedicated to waiting times in its most updated version will appear among the first five results.	1
	1.5 Language	The section dedicated to waiting times is translated in at least one foreign language (e.g. English).	1
	1.6 Additional aids	Audio and/or visual additional aids for the user are provided (e.g. possibility to change font size or color contrast).	1
	<i>SUBTOTAL</i>		
2. Architecture	2.1 Page layout	The page layout is clean and functional. Informative structures are placed with a visual hierarchy that organizes content in an easy-to-read fashion and helps users complete their task.	1
	2.2 Color scheme	The color choice is appropriate. Content is not hard to read because of poor contrast, unclear format, either too dark or too saturated colors.	1
	2.3 Page rendering	The page renders properly and content is consistently readable. Text is neither overlapped nor cut.	1
	2.4 Headings and titles	Section headings and titles are named appropriately and are representative of section content.	1
	2.5 Key contents	Key contents are clearly visible and recognizable as compared to normal text.	1
	2.6 Brand identity	The section dedicated to waiting times must be univocally identifiable as belonging to the agency. If a search is performed with the query “(ATS/ASST/IRCCS name) AND (waiting OR waiting lists OR waiting times)” on the most commonly used web search engine (Google), at least one of the first five result titles will have the correct and updated name of the agency or structure.	1
	<i>SUBTOTAL</i>		
3. Content	3.1 Basic information	The section provides basic information about waiting times, waiting lists, demand governance, meaning and implications of priority classes (U/B/D/P).	1
	3.2 Linguistic register	Content is explained with clear words and a reader-friendly style, jargon is avoided whenever possible, all abbreviations and technical terms are explained.	1

	3.3 Waiting times	Data about waiting times for all outpatient specialist services in the whole territorial area over the last six months are displayed.	1
	3.4 Data quality	The section provides appropriate and easy-to-read information without overwhelming the user with excessive or overly verbose content.	1
	3.5 Monthly data update	Exposed data about waiting times are updated at least monthly.	1
	3.6 Weekly data update	Exposed data about waiting times are updated at least weekly.	1
	<i>SUBTOTAL</i>		6
4. Interactivity	4.1 User-friendliness	The section provides interactive elements, and the sequence of interaction is logical and user-friendly (e.g. a logical tab order between interactive elements is followed, labels/instructions/icons on interactive elements are clear).	1
	4.2 Filter	It is possible to set search criteria that filter results by service type and provider.	1
	4.3 Feedback	The section includes a contact form or a customer satisfaction survey tool.	1
	4.4 Interactive elements	Elements which are interactive and clickable (e.g. links, banners) are immediately distinguishable and recognizable.	1
	4.5 Link maintenance	All available links are working and updated.	1
	4.6 External sources	Whenever a link redirects to a different website or starts download of a document or file (e.g. XLS / PDF extensions), this is clearly indicated in advance.	1
	<i>SUBTOTAL</i>		6
5. Utility	5.1 Booking	Either the section provides thorough information about booking channels and modalities (at least CUP telephone number, booking offices, online), or a banner/link to a dedicated section is always evident.	1
	5.2 Providers	The section provides contacts and/or additional information and details about the providers (at least addresses and phone numbers and/or links to their respective websites).	1
	5.3 Regional website	The section provides a link to the Lombardy Region Healthcare website section dedicated to the MOSA flow (https://www.prenotasalute.regione.lombardia.it/sito or alternatively https://www.crs.regione.lombardia.it/sanita).	1
	5.4 Intramoenia	The section informs users that if waiting times for public healthcare services exceed maximum limits over the whole ATS territory, they may receive the services from the public provider they first addressed under a pay-for-performance regime, the provider being charged of all additional costs.	1
	5.5 Ambulatori Aperti	Either the section provides information about the “Ambulatori Aperti” project initiated by Lombardy Region (adherent providers, timetables, booking methods), or a banner/link to a dedicated section is always evident.	1
	5.6 Empowerment	The section provides information aimed at educating and empowering users in order to raise awareness about the issue of waiting times, govern demand and tackle no-shows.	1
	<i>SUBTOTAL</i>		6
	TOTAL		30

Table 2. Sub-total and total scores (median, Q1-Q3) obtained by all websites and by groups.

	Total, median (Q1-Q3)	ATS, median (Q1-Q3)	ASST / IRCCS, median (Q1-Q3)
Accessibility	3 (2 - 4)	4 (3.75 - 4.25)	2 (2 - 3)
Architecture	5 (4 - 6)	6 (5.75 - 6)	4.5 (4 - 5)
Content	3 (2 - 4)	5 (4.25 - 5)	3 (2 - 3.75)
Interactivity	3 (3 - 4)	4 (4 - 5)	3 (2 - 3)
Utility	3 (2 - 4)	2 (1.75 - 2.25)	3 (2 - 4)
TOTAL	16 (14.25 - 18)	19.5 (18 - 22)	15 (13.25 - 17)

Table 3. Raw number and proportion of ATS and ASST/IRCCS websites fulfilling the score for every item.

	TOTAL, n (%)	ATS, n (%)	ASST / IRCCS, n (%)
External search engine	36 (94.7)	8 (100.0)	28 (93.3)
Mobile devices	17 (44.7)	6 (75.0)	11 (36.7)
Homepage	14 (36.9)	8 (100.0)	6 (20.0)
Internal search feature	24 (63.2)	6 (75.0)	18 (60.0)
Language	0	0	0
Additional aids	17 (44.7)	4 (50.0)	13 (43.3)
Page layout	24 (63.2)	8 (100.0)	16 (53.3)
Color scheme	35 (92.1)	8 (100.0)	27 (90.0)
Page rendering	34 (89.5)	6 (75.0)	28 (93.3)
Headings and titles	32 (84.2)	7 (87.5)	25 (83.3)
Key contents	18 (47.4)	8 (100.0)	10 (33.3)
Brand identity	34 (89.5)	8 (100.0)	26 (86.7)
Basic information	29 (76.3)	8 (100.0)	21 (70.0)
Linguistic register	20 (52.6)	7 (87.5)	13 (43.3)
Waiting times	29 (76.3)	6 (75.0)	23 (76.7)
Data quality	6 (15.8)	6 (75.0)	0
Monthly update	26 (68.4)	6 (75.0)	20 (66.7)
Weekly update	2 (5.3)	1 (12.5)	1 (3.3)
User-friendliness	6 (15.8)	6 (75.0)	0
Filter	6 (15.8)	6 (75.0)	0
Feedback	8 (21.1)	1 (12.5)	7 (23.3)
Interactive elements	35 (92.1)	7 (87.5)	28 (93.3)
Link maintenance	32 (84.2)	6 (75.0)	26 (86.7)
External sources	31 (81.6)	8 (100.0)	23 (76.7)
Booking	23 (60.5)	2 (25.0)	21 (70.0)
Providers	29 (76.3)	5 (62.5)	24 (80.0)
Regional website	18 (47.4)	4 (50.0)	14 (46.7)
Intramoenia	4 (10.5)	1 (12.5)	3 (10.0)
Ambulatori Aperti	11 (28.9)	1 (12.5)	10 (33.3)
Empowerment	18 (47.4)	2 (25.0)	16 (53.3)