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The Piemonte Regional Allergy Network: a model of healthcare organization

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Key words

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Summary

The Allergology Hospital Network and Regional Register for Severe Allergic Reactions (Regional Observatory) is the Piemonte Health Authority new challenge. It satisfied the need to promote and monitor the best practice among a variegated pool of specialists and to define both state of the art and evolution of efficiency and efficacy of standard working process. Harmonization in clinical daily activities and report of severe allergic reactions notified to Regional Observatory, had been gained by mean of a customized Information Technology (IT) solution. The overall target is to ensure a correct diagnostic treatment to patients with severe allergic reactions preventing possible future reactions. Statistics data as a whole, provide basilar epidemiological information to allocate both economical and human resources and to fulfill the rising of health diseases. Piemonte Allergology Medical Network with the Regional Register are an Italian unique and innovative project. It would represent a benchmark for other medical branches.

Introduction

The overall decrease in economic resources together with the increase in healthcare demand require resources rationalization policies. Promotion of specific health programs gains efficacy and economical efficiency only if based upon consistent and comprehensible data.
The Regional Health Authority in Piemonte (Italy) planned to collect data and gain resource rationalization through a web of healthcare networks.
Allergology Hospital Network and Regional Register for Severe Allergic Reactions (Regional Observatory) are a new challenge, established by Law since 2001 (see Appendix A).
First step of the project was to grant uniformity and consistency of health related processes and to identify a common language for an easier data sharing and interpretation.
It required identification of best practice among a variegated pool of specialists and a following definition of both state of the art and evolution of efficiency and efficacy in established working processes.
The network focuses on integrated poly-specialized services managed by Allergists and provided by Hospital and Local Health Authorities.
Further developments will range from accreditation to quality certification for any provided services, following the pattern established by Piemonte Transplant network, quoted in 2005 as a Country Centre of Excellence.

The allergy network's structure

Professional services, supplied by specialized physicians, had been systematically spread across a specific geographical area and primarily supplied by hospital facilities, often related to an Emergency and Reception Department (3).
Moreover, the network defines specific healthcare levels to be provided to patients and identifies a range of "Reference Centre" in order to supply state-of-the art health services and ensure technical-scientific support.
Established working-teams within the Allergology Hospital Network cooperate in defining the main topics for the constant training of physicians and nurses, to provide monographic information pamphlets and to verify diagnostic and therapeutic guidelines.

IT - Information Technology System

Harmonization in clinical daily activities and in report of severe allergic reactions notified to Regional Observatory, had been gained by mean of a customized IT solution. It allows:

- to acquire epidemiological and clinical data (age, sex, diagnosis, etc);
- to identify patients subject to anaphylactic risk;
- to track all provided services (diagnostic tools, prevention activities, therapies);
- to collect economic and activity data for a single Reference Centre as well as on a large scale;
- to share all available information (prevention guidelines, agreement forms, etc);
- to obtain real-time information (through memos, regional deliberations, guidelines, etc).

The strategy to use the form of Web Application lets it operates directly from a browser (such as Internet Explorer) just like a regular webpage.
Such web application allows to access the system from any computer, connected within the network without installing any supplementary software. It was designed according to scalability techniques allowing any possible future upgrade. Privacy defense is granted by a centralized archive, which is extremely sheltered with regard to any possible unauthorized access or hacker attack.
The IT system fulfill the network's requirement in terms of data acquisition, fast statistical analysis and synergy among all involved facilities. For example, any allergist in any regional and/or poly-district "Reference Centre" can read patient's clinical data, in case of patients informed consent.
The IT system also grants an increasing value in terms of health policies evaluation, as far as the database is available for statistical analysis and statistical investigation by the Regional Health Authority.

The Regional Register for severe allergic reactions (Regional Observatory)

The Regional Observatory aims to ensure a proper diagnostic treatment of patients with severe allergic reactions providing useful information, ensuring effective long-term management of allergic patients and preventing possible future reactions (3-6).
Online connection with the 118 Italian Emergency Service (112 in the others European Countries) and with Emergency Rooms of all of the major hospital facilities located in Piemonte has been scheduled as a short term development.
Physicians must report the most severe cases to the Observatory according to a standard protocol (Brown's classification (7-9)) and prescribe self-injectable epinephrine to the patient.
The regional servers used for project management are based at the 118 Service Emergency Centre, in Torino, thus supporting the project by making allergy-related data visible to the Emergency system.

Results

The Network works effectively since January 2004. It is built upon 13 Local Health Agencies and 8 Hospitals, and connects 71 Allergy Units, 174 health operators, physicians and nurses.
Next tables will show the most significant data collected in the network's "data base".
From 2004 to 2009, 162.017 patients were examined (Tab. 1)

Table 1 - Patients splitting for age and sex (2004-2009)

AGE	Female	Male	Total
0 - 3	1134	1578	2712
4 - 6	3199	4420	7619
7 - 17	11420	15281	26711
18 - 39	34181	22547	56728
40 - 59	27198	14735	41933
Over 60	17415	8909	26324
Total	94547	67470	162017

Table 2 - Cluster of the diagnoses included by the network (total diagnosis 238.265)

Diagnosis	Observed Cases	%	Diagnosis	Observed Cases	%
Angioedema	5273	2.21	Adverse drug reaction	9490	4.00
Bronchial asthma	25128	10.54	Adverse food reaction	8312	3.48
Conjunctivitis	2934	1.21	Eczema	20666	8.67
Anaphylaxis	3558	1.49	Internal medicine diseases	1771	0.74
Urticaria	15869	6.69	Pollinosis	9948	4.17
Other allergic diseases	1430	0.60	Rhinitis, polyposis, sinusopaty	63243	26.54
Eosinophilic disorders	213	0.09	Auto immune diseases	109	0.04
Other respiratory diseases	9823	4.12	Other dermatologic diseases	2307	0.96
Not specific nor allergic diseases	46150	19.36	Unfinished diagnoses	11798	4.95

and their clinical data generated the network's database, with 238.265 diagnoses.

Table 2 shows the classification by diagnosis: some generic groups may require a further specification:

- "Other allergic diseases" includes latex or hymenoptera venom allergy.
- "Not specific nor allergic diseases" means negative allergic testing (cutaneous or in vitro testing), no evidence of allergic diseases and also no completed diagnostic procedure.
- "Internal diseases" means for example gastro esophageal reflux, anxiety, Irritable bowel diseases etc.
- "Other respiratory or dermatology diseases" includes some of the more frequent diseases, for example COPD, cough, psoriasis, non-specific pruritus, etc.

The operator can select a group of generic diagnosis (urticaria, asthma, eczema, anaphylaxis), and then specify the details of diagnosis (e.g. cold urticaria, chronic urticaria, moderate rhinitis, etc.). More than one diagnosis can be selected.

Table 3 - The prevalence rate of the diagnosis referred to all the Region in 2009, as Directly Standardize Rate obtained by applying the age specific rate to the Regional Age distribution take as standard age distribution.

Diagnoses	Year 2009	
	Observed cases (all the Region)	Directly Standardized Rate x 100.000
Anaphylaxis	718	16,198
Adverse drug reaction	2034	45,888
Urticaria	3708	83,653
Eczema	4686	105,717
Angioedema	1139	25,696
Adverse food reaction	1922	43,361
Pollinosis	2230	50,309
Rhinitis, sinusitis, polyposis	16047	362,025
Asthma	5238	118,171
Other respiratory diseases	2767	62,424
Other dermatologic diseases	716	16.153
Conjunctivitis	790	17,823
Internal Medicine diseases	520	11,731
Eosinophilic Diseases	55	1,241
Auto immune diseases	31	0,699
Other allergic diseases	408	9,205

In 2009, the whole project generated n. 2002 (Tab. 4) reports to the Observatory based on 44,730 patients with 59,721 new diagnoses. This value must be compared to the number of inhabitants of Piemonte (4,532,571 as at December 2008 – see Table 3).

The most frequent diagnoses were different types of anaphylaxis (89.06%), for the most part represented by Hymenoptera Venom anaphylaxis (44,91%) (10).

Age distribution shows that most patients ranged between 18 and 59 years of age. Moreover, a significant level of anaphylactic reactions is also present in over sixty patients (21,52%) (12).

Discussion

The Allergology Network offers quick and immediate tools for a detailed statistical analysis of daily collected data. It provides the epidemiological information required by Authorities to set an appropriate health policy in terms of allocation of both economical and human resources.

The Network represents an interaction system between medical facilities and regional health services.
It must be underlined that the network is efficient in terms of economical costs because data are gathered in servers shared with other epidemiological/healthcare Piemonte's networks: overall cost can be quantified in about 100.000,00 euros/year.
Middle-term benefits consist in ensuring homogeneity and quality, facilitating operator's routine job, thus reducing work time and costs.
Clinical data collection in a large geographical area and the project to evaluate the rate of cost/benefit of immunotherapy is now daily task for many "Reference Centres". It allows to interpret allergic patients' health in "real life".
The large number of patients and related diagnoses is useful to calculate prevalence rates of different clinical allergic diseases. Severe life threatening reactions are identified in a consistent number of patients (1.2%).
Data base connection between Observatory and 118 Emergency Service will provide an additional value to health care service.
A yearly Network's Report is published by regional offices and available on the Regione Piemonte web site (10).
The Piemonte Allergology Hospital Network and Regional Observatory for Severe Allergic Reactions are an unequalled experimentation in Italy, and maybe in Europe (15-17), and represent a suitable model for other medical branch. Further efficiency of the project will be gained through an higher level of synergy between software's development and strictly co-operation among network operators.

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Table 4 - Regional Register data collected (2004/2009)

Diagnosis	0-3	4-6	7-17	18-39	40-59	over 60	Total
Hymenoptera Venom anaphylaxis		5	36	210	359	289	899
Food anaphylaxis	28	63	164	216	111	27	612
Anaphylaxis (not specified)		3	13	35	41	20	112
Drug induced anaphylaxis			4	16	52	39	111
Idiopatic anaphylaxis			2	11	14	7	34
Drug induced angioaedema			4	14	17	15	50
Urticaria angioaedema syndrome			1	12	5		18
Food induced urticaria angioaedema				11	4	3	18
Exercise food induced anaphylaxis				10	5		15
Bronchial asthma			1	8	3		12
Other			1	26	16	13	56
Total cases	28	76	231	585	651	431	2002

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