



Preparedness and response plans to reduce the health impact of heat waves in Italy

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Background

Every summer, heat waves have a noteworthy impact on the health of populations living in urban areas, in particular those individuals who due to their health, social and living conditions are considered at high risk (susceptible subjects). Italy is one of the European countries mostly affected by heat waves; since 2004, a national program to reduce heat-related health effects has been implemented and to date includes 34 cities (Figure 1). The main components of the Italian program are: city-specific Heat Health Watch Warning Systems (HHWWS), the national real time mortality surveillance system and local prevention activities targeted to susceptible individuals.

Figure 1. National prevention program: cities included



● HHWWS + Mortality Surveillance System
● Mortality Surveillance System

Objectives

The objectives are to present the major components of the program discussing possible public health implications and to evaluate the impact of heat waves on mortality among the elderly (≥ 65 years) during summer 2011.

Methods

The Italian HHWWS models are based on two approaches. The first is based on monthly thresholds of maximum apparent temperature (Tappmax) associated with low and high mortality risk in the 65+ population. In the largest urban areas, an air mass based approach is also used. Every day during summer, the level of risk for the following 72 hours is graded on the basis of both model outputs from level 0 (no risk) to level 3 (heat wave). City-specific warning bulletins are distributed at both the national and local level. HHWWS are coupled with the national mortality surveillance system for the real time monitoring of the impact of heat during summer. The daily observed number of deaths among the resident population aged 65+ is updated daily within the system.

To evaluate the impact of heat waves, mortality excess is calculated as difference between observed and expected deaths during the heat wave period. Expected daily mortality is obtained from historical time series data available for each city from 1995 to 2008. Heat waves are defined as a period of at least three consecutive days in which HHWWS predicted level 2/3 risk conditions for health.

Prevention activities at the local level are based on national guidelines defined by the Ministry of Health and are modulated according to the warning levels issued by HHWWS. Every year, a survey is carried out by the Ministry of Health to retrieved information on local prevention activities.

Results

Results for summer 2011 are reported as example. A first heat wave was observed between the 7-15th July 2011; while a major heat wave event was observed between 17-27th August (Figure 2). Heat wave conditions were more prolonged and intense in north and central cities, with peak values of Tappmax between 34-39°C. Table 1 shows the impact on mortality of the August heat wave in the Italian cities. Significant mortality increases were observed in several cities, with a substantial heterogeneity among cities (i.e. mortality excess ranged from +20% in Bologna and Firenze to +62% in Ancona and Perugia). Table 2 summarizes these prevention activities in place in the Italian cities. Most cities have a formal plan to coordinate prevention activities. Social activities such as informative campaign, telephone help lines and social services are also widespread. Crucial activities are the identification of at-risk subjects and the health surveillance of at risk individuals by GPs or by health and social workers, but they are still not widespread.

Figure 2. Daily level of risk predicted by HHWWS during August 2011

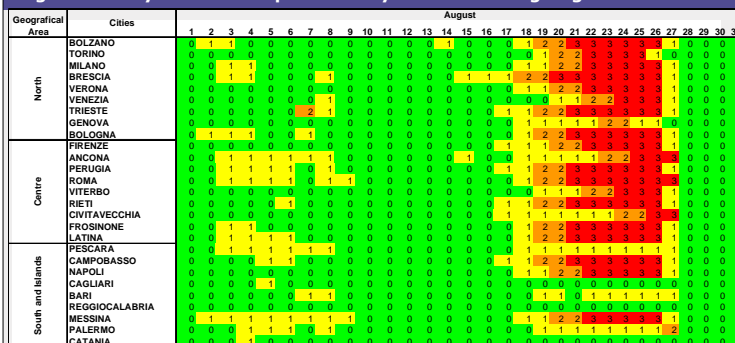


Table 1. Observed, expected and excess mortality in the population aged 65+ yr during August 2011 heat wave in Italian cities

City	Period	Deaths 65+ yr				p-value
		Observed	Expected	Excess	% change	
BOLZANO	17-31	24	29	-5	-17	0.307
TORINO	19-31	280	187	93	50	<0.001
MILANO	20-31	340	237	103	43	<0.001
BRESCIA	17-31	60	56	4	7	0.606
VERONA	19-31	53	71	-18	-25	0.013
VENEZIA	19-31	87	87	0	0	1
TRIESTE	17-31	118	98	20	20	0.066
BOLOGNA	18-31	147	123	24	20	0.048
FIRENZE	17-31	147	123	24	20	0.048
ANCONA	22-31	34	21	13	62	0.026
PERUGIA	16-31	76	47	29	62	0.001
ROMA	17-31	782	628	154	25	<0.001
VITERBO	21-31	15	10	5	50	0.197
RIETI	17-31	12	12	0	0	1
CIVITAVECCHIA	23-31	15	8	7	88	0.071
FROSINONE	18-31	13	9	4	44	0.267
LATINA	18-31	35	23	12	52	0.043
CAMPOBASSO	18-31	9	11	-2	-18	0.505
NAPOLI	19-31	259	250	9	4	0.576
MESSINA	18-31	79	77	2	3	0.822

Table 2. Elements of local heat-prevention plans in Italian cities: summer 2011

Preventive measure	Coverage*	Description
Written prevention plan	+++	Guidelines including prevention activities and health/social services available
Educational campaign	+++	Informative fliers in health centres and GPs. Specific advices during heat waves.
Educational programmes	++	Training, seminars/workshops, diffusion of guidelines among health/social workers
Emergency protocols	+	Measures to improve operative efficiency in hospitals, nursing homes, social centers
Availability of air-conditioning	++	Air-conditioning in health/social centres and increase access during heat waves
Register of susceptible subjects	++	Identification using health information system or notification by GPs/social workers
Health surveillance	++	Phone calls and home visits by GPs. Help-line and network of health/social services
Telephone help-line	+++	Dedicated help-line providing social support services or regular telephone contact
Social support services	+++	Home visits, personal, home care, pharmacy services by social workers or volunteers

GPs: General Practitioners
* +: <50%; ++: 50-70%; +++: >70%

Conclusions

Although the national Prevention Plan has been operational since 2005, heat waves still have a significant impact on mortality in Italian cities. However, results indicate heterogeneity of the impact among cities, also attributable to the different prevention activities implemented and the proportion of high risk population included in the program in each city. This underlines the need for further improvement in some of the components of the Italian program, i.e. strengthening interventions specifically targeted to the susceptible populations, better modulation of activities especially during heat wave days and the evaluation of prevention activities to identify the most effective taking into account the local context.