

Social determinants effects from the Italian risk factor surveillance system PASSI

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Abstract

Objectives To offer examples on how risk factor surveillance systems can help in providing useful information on social determinants effects and health inequalities.

Methods The Italian risk factor surveillance system (PASSI) collects monthly information from most of the Italian Local Health Units (over 85% of the Italian population is covered) on major health-related behaviours together with information on health practices, attitudes and opinions. Multivariate analysis of associations with possible indicators of social determinants collected by the system, offers important indications on the value that the system has in providing useful information on the effects of social determinants.

Results Social determinants, although measured through very simple indicators, have major influence on health outcomes (in the example here, depression), geographical disparities in health (efficacy of smoking ban), and access to preventive services (pap test in our analysis).

Conclusions Risk factor surveillance can offer valuable information for monitoring social determinants effects and inequalities, and, when considering data over time, for

evaluating the gross impact of future interventions and policies aimed at reducing them.

Keywords Risk factor surveillance · Social determinants · PASSI · Depression · Smoking ban · Pap test

Introduction

Social determinants (SD) are one of the leading issues for public health at the start of this millennium. Their impact on health status has been widely proved both in high and low income countries (WHO 2008). Notwithstanding this evidence, it is still under discussion where to find valuable sources of information for policy action, particularly on the effects produced by SD and their modification over time. This information is needed both for planning new interventions and for evaluating those already implemented.

This paper shows how Behavioural Risk Factor Surveillance (BRFS) systems (McQueen and Puska 2001; Campostrini and McQueen 2005) are interesting sources to meet some of the SD information needs, offering examples with actual data from the Italian BRFS system, named PASSI (acronym for Progress in the Italian Local Health Units) (Campostrini et al. 2009).

One of the questions concerns what kind of information BRFS can offer, given that most of the ones that have been running for several years were designed for different purposes than SD surveillance. Certainly in the future BRFS will be hopefully even more focused on SD. Nevertheless we believe that also most of the systems presently running allow already for several interesting and informative analyses. For instance, BRFS system such as PASSI can be informative in these three major areas linked to SD:

On behalf of the PASSI Coordinating Group. Members of the PASSI Coordinating Group are listed in Acknowledgments section.

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- showing different level of self-perceived health status, according to some SD indicators, usually collected in these surveys (e.g., socio-economic status);
- detecting geographical differences;
- showing differential access to health services and differential effectiveness of health interventions in population subgroups (determined by social economic status or race/ethnicity).

Here we will present one example for each of these three areas to show with actual data the potential information of BRFS.

After briefly presenting the methodology on which our examples are based, we will discuss the role and value of this information in the context of health promotion.

Methods

The Italian public health system is organized in three levels: national, with a major role played by the Ministry of Health; regional (Italy has 19 Regions and 2 independent districts, “*province autonome*”, with a population ranging from few hundred thousands to over 9 million), and local (with the Local Health Units (LHU) approx 160 that are responsible of an average population of 250,000, with a high variability, ranging from 30 to 50 thousand in rural areas to over one million in some metropolitan areas).

Strategic directions of health policies are decided at national level in collaboration with a committee of the regional authorities. Policies are then decided at regional level and implemented at the local one (LHU).

In the Italian BRFS PASSI system (Gruppo tecnico PASSI 2007, 2008, 2009; Baldissera et al. 2011), staff of the public health department in the LHUs are responsible for carrying out interviews, data processing and analysis. As of today (Dec 2010) 90% of LHUs have joined the PASSI system.

In PASSI a random sample is extracted monthly in each LHU from the lists of enrolled residents aged 18–69, stratified by six gender and age groups (18–34, 35–49, 50–69 years). The number of samples extracted depends on the number of resident population in each of these strata. The sample size (minimum 25/month for each LHU) provides annual estimates of the main variables at LHU level with an acceptable accuracy and sub-annual estimates at regional and national levels.

A letter with a detailed explanation is sent in advance to the selected persons and their General Practitioners (GPs). Telephone numbers are obtained from enrolment lists, telephone directories, GPs, or provided by the persons themselves when they call to make an appointment after receiving the letter from the LHU.

Interviews are carried out by telephone, at least six attempts are made to call on different days of the week (including week-ends) and at different times of day; if a selected person cannot be reached, a substitute from the same gender and age group is randomly extracted. This procedure ensures the representativeness of the sample at LHU level, and has proved to be highly effective. Refusal rates (about 10%) and total response rate (over 80%) are exceptionally high for a system based on telephone interviews, particularly in comparison with similar national and international systems. The quality of data collection is automatically monitored, using process indicators modelled after international standards (AAPOR 2008).

National or sub-national pool estimates are calculated by aggregating the data from the different LHUs. An appropriate weighting system is computed at LHU level to produce representative estimate for the regional and national level. Since the LHUs differ considerably in terms of population size, and the sizes of the samples also differ substantially, a weight specific for each LHU stratum (defined by sex and three age group) is added to each record which takes into account the number of interviews performed in each of the six strata of the LHU's sample and the size of the corresponding strata in the LHU's target population.

Questionnaires of similar surveys were taken as a reference (e.g., the American BRFSS, Italian Multipurpose ISTAT), so as to provide information on validity (questions already tested for validity and comparability purposes) and to allow an international comparison (CDC 2006; ISTAT 2004).

The PASSI questionnaire is structured and standardized. Almost all questions are close-ended and multiple choice. A wide variety of behavioural and preventive topics are covered, including priorities of the National Health (Ministry of Health 2006) and Prevention Plans (CCM 2005) (e.g., self-perceived health and quality of life, cardiovascular risk, obesity, smoking habits, alcohol consumption, physical inactivity, oncology screenings, vaccinations, road accidents, accidents at home, mental health). The core questionnaire comprises 114 questions grouped in 12 modules. Many questions are addressed only to specific population subgroups.

Among the several variables available in the data set, we selected three examples useful to show the potential of BRFS in the study of health determinants, one for each of the aspects mentioned above:

- symptoms of depression by SD to evaluate possible inequalities;
- respect of the smoking ban by Regions to assess geographical variation;
- adherence to screening program to evaluate differential access to prevention by SD.

Before presenting these data, here we will briefly discuss how these aspects have been measured.

The presence of symptoms of depression is estimated through an indicator based on a modified (and validated) version of the Patient Health Questionnaire-2 (PHQ-2) (Kroenke et al. 2003). The first question identifies the number of days in which the respondent has experienced little interest in doing things in the past 2 weeks; while the second identifies number of days in which the respondent has felt depressed or without hope; answers were coded on a point scale between 0 and 3 as follows 0 = 0–1 days; 1 = 2–6 days; 2 = 7–11 days; 3 = 12–14; points from the two questions are summed. Depression is assessed with a score ≥ 3 out of a possible six.

In order to evaluate the respect of the smoking ban, a question is worded as follows: “In the public places (like bars, restaurants, wine bars, and pubs) in which you have been in the last 30 days, do you think that the other people respect the smoking bans? always-almost always/sometimes/do not respect it”. A similar question is asked to indoor workers regarding smoking in their workplaces. Even though the information obtained is a self reported perception of the respect of the law, it is a good proxy indicator of the real situation, particularly for space and time comparisons. In the data analysis a dichotomous indicator of respect for both public and workplaces is defined as always/almost always respect vs sometimes/do not respect it.

To evaluate the differential accessibility to preventive services we have analyzed data concerning the Pap test screening program. The questionnaire includes a special section addressed to women aged 25–64; respondents are asked whether they have ever performed a Pap test as a preventive measure and, if yes, when was the last time they did. An indicator of adherence to the guidelines has been defined, estimating the prevalence of women aged 25–64 who report having made the last Pap test in the last 3 years as a preventive measure, according to indications from the National and International guidelines (Italian Ministry of Health 1996; Arbyn et al. 2008).

Socio-economic status is measured by education, occupation, and income (economic difficulties). In the PASSI questionnaire education levels are measured according to 4 level scale: 1 = no education or primary education (i.e. 0–5 years of education); 2 = lower secondary education (approximately 8 years); 3 = higher secondary education (approximately 13 years), and 4 tertiary education (bachelor's degree or higher).

For occupation two categories are identified: full/part time job vs not working.

The PASSI system also detects self-perceived economic difficulties asking if the respondents experience difficulties in arriving at the end of the month with the personal/

familiar financial resources available (four possible answers: I get at the end of the month very easily, quite easily, with some difficulties, with many difficulties). This indicator has resulted to be a good proxy of personal and household income, typically difficult to ask in countries like Italy. Furthermore we considered in the analysis: the living status (alone vs with others) and the marital status, as possible interesting confounders that could influence health status. Finally, nationality is reported as Italian or others (in the analyses here presented we did not distinguish by the country of origin).

Data were analyzed in EpiInfo version 3.5.1 and STATA 9.0 using appropriate procedures to account for the complex survey design.

All the Confidence Intervals (CI) have been computed taking 95% as confidence level.

Results

More than 30,000 interviews were performed in the participating LHUs during the period April 2007 and March 2008. The characteristics of the study population are shown in Table 1.

The results of the analysis of the data collected offer a picture that seems to be consistent with the actual population. The distribution of age and gender of the respondents reflects the distribution of the population in the area covered. Education levels, as well as economic status, are consistent with the estimates of poor population released yearly by the National Institute of Statistics (ISTAT 2009).

Depression

A total of 29,573 interviews out of 30,408 were analyzed. 8.9% (CI 8.5–9.4%) of the respondents met the case definition of depression, with regional differences that range between 4.0% (CI 2.7–5.3%) in the district of Trento (North Italy) and 11.0% (CI 9.4–12.5%) in Lazio, the Region of Rome.

Older age, female gender, lower education attainment, financial difficulties, living alone, and not being employed showed a strong association with depression (Binkin et al. 2010). In the multivariate analysis, the odds of depression decreased for all risk factor observed (Table 2). The strongest relation was obtained for gender (OR 2.1; CI 1.9–2.3) and serious financial problems (OR 3.9; CI 3.5–4.4). Also the association with unemployment (OR 1.3; CI 1.2–1.5) and loneliness (OR 1.4; CI 1.3–1.7) was significant. A gradient was noted for age, and education; the lower the education level and the greater the age, the greater the prevalence of depression.

Table 1 Socio-demographic characteristics of the population based on data from PASSI, the Italian behavioural risk factor surveillance system, Italy, 2007–2008 ($n = 30,408$)

Characteristic	%	95% CI
Age, years		
18–34	31.4	31.2–31.6
35–49	33.7	33.5–33.9
50–69	34.9	34.8–35.1
Sex		
Male	49.6	49.4–49.8
Female	50.4	50.2–50.6
Living situation		
Lives alone	6.9	6.5–7.2
Lives with others	93.1	92.8–93.5
Educational attainment		
Primary school or less	13.3	12.4–13.4
Middle school	30.6	30.0–31.3
High school	43.2	42.5–43.9
University	12.9	12.8–13.7
Employment		
Works full or part time	63.8	63.1–64.5
Does not work	36.2	35.5–36.9
Economic difficulties		
None	44.2	43.5–44.9
Some	41.5	40.7–42.2
A lot	14.3	13.7–14.9
Geographical areas		
North	38.9	38.7–39.0
Centre	27.4	27.3–27.6
South	33.7	33.5–33.9
Nationality		
Italian	97.6	97.4–97.8
Others	2.4	2.2–2.6

It should be noticed (fourth column in Table 2) how economic difficulties remain the leading factor associated with depression when all the effects of other possible confounding variables have been taken into account. The odds ratio of showing symptoms of depression is four times higher for those with economic difficulties, also when we standardized by age, gender and education, i.e., the only presence of economic difficulties increases of four times the possibility of showing depression, even considering persons of same age, gender and education.

Smoking

Thirty percent (CI 29.6–31.0%) of the respondents were classified as smokers (i.e. a person who has smoked more than 100 cigarettes in his/her lives, or smokes every day, or has stopped smoking less than 6 months ago). This

percentage ranged between 24.8% (CI 22.0–27.5%) in the district of Trento and 32.7% (CI 30.6–36.9%) in Campania, the Region of Naples.

Italy has been the fourth country in the world to enact a nationwide smoking ban. Since 2005 it is forbidden to smoke in all public indoor spaces (including bars, cafés, restaurants and discos), and in work places (Binkin et al. 2007; Gallus et al. 2007). It is strictly enforced and fairly respected by the population, although compliance with the law is variable over the regions (Table 3).

Eighty-five percent (CI 84.3–85.6%) of the respondents reported that the ban was respected ‘always/almost always’ in public indoor spaces; and 85.4% (CI 84.3–85.6%) in work places. In Table 3, regional values for the two indicators are shown. The respect of the smoking ban in public indoor or in workplaces ranged from the lowest value in Sicily for both indicators (respectively, 69.1 and 77.5%) to the maximum value in Trento for public indoor places (95.8%) and in Bolzano (93.4%) for indoor workplaces. The difference between regional values is statistically significant.

An example of how this information is usually reported to decision makers and the general public is shown in Fig. 1. Mapping represents an important communication tool also to highlight SD effects, being direct, easy to read and requiring no statistical expertise to understand differences among geographical areas.

Pap test

To present an example of differential access to preventive programs by SD, we chose the case of the Pap test. Here we have analyzed only data collected in northern regions (Piemonte, Valle D’Aosta, Bolzano, Trento, Veneto, Friuli-Venezia Giulia, Liguria, and Emilia-Romagna), where, given the higher presence of regular immigrants, the percentage of foreign women aged 25–64 in our sample was 4.8% out of 6,883 interviews collected, while in the entire sample of LHUs PASSI pool was limited to 2.4%.

The foreign female respondents are different from Italian in few socio-demographic characteristics. Female immigrants are younger than Italians (respectively, 44.0% vs 22.9 of 25–34 years old, 41.7 vs 41.4 of 35–49 years old and 14.4 vs 35.8% of 50–69 years old); they declared more financial difficulties (respectively, very easily or quite easily 30.5 vs 51.9%, with some difficulty 44.1 vs 37.7%, with many difficulties 25.4 vs 10.4%) and present a less percentage of workers 53.8 vs 66.4%. But they have the same education levels, marital status and living situation of those with an Italian citizenship.

Since the PASSI system included only those immigrants that were able to hold the interview in Italian and that were

Table 2 Prevalence of depression as measured by the Patient Health Questionnaire-2 (PHQ-2), by socio-demographic risk factor, PASSI 2007–2008, Italy ($n = 29,573$)

Characteristic	Prevalence of depression (%)	Unadjusted odds ratio (95% CI)	Adjusted odds ratio (95% CI) ^a
Total	8.9 (95% CI 8.5–9.4)	–	–
Age, years			
18–34	6.5	Referent group	Referent group
35–49	8.5	1.2 (1.1–1.4)	1.2 (1.1–1.4)
50–69	11.6	1.7 (1.5–1.9)	1.4 (1.2–1.5)
Sex			
Male	5.6	Referent group	Referent group
Female	12.3	2.4 (2.2–2.6)	2.1 (1.9–2.3)
Living situation			
Lives alone	12.3	1.5 (1.3–1.8)	1.4 (1.3–1.7)
Lives with others	8.7	Referent group	Referent group
Educational attainment			
Primary school or less	16.1	2.8 (2.4–3.4)	1.5 (1.2–1.8)
Middle school	9.6	1.7 (1.4–2.0)	1.3 (1.1–1.5)
High school	7.4	1.3 (1.1–1.5)	1.2 (1.0–1.4)
University	5.4	Referent group	Referent group
Employment			
Works full or part time	6.7	Referent group	Referent group
Does not work	12.3	2.0 (1.8–2.1)	1.3 (1.2–1.5)
Economic difficulties			
None	5.3	Referent group	Referent group
Some	8.8	1.7 (1.6–1.9)	1.6 (1.4–1.7)
A lot	20.7	4.8 (4.2–5.3)	3.9 (3.5–4.4)

^a All variables were included as covariates in multivariate model. All odds ratios are significantly higher than 1 ($P < 0.05$)

enrolled in the LHU registers, it potentially provides information only about the more integrated immigrants.

Foreign women performed the Pap test less than Italian women (respectively, 65.6 vs 83.9% had a Pap test in the last 3 years, following national and international recommendations). Coverage estimated with PASSI system among the foreign women was equal to the level of coverage considered as “acceptable” (65%) but lower than the “desirable” level (80%) of the national recommendations (Italian Ministry of Health 1996).

They received less attention by health professional in term of promotion practices: 18.7% of the immigrants did not receive any kind of suggestions (letter, counselling or media campaign) versus a percentage of 4.7% among Italians. In particular, 40.3% foreign woman respondents declared they had received counselling, while this rate for Italian women is 63.5%; 56.3 vs 73.9% received invitation letters sent by LHU, and only 45.0% declared to remember information campaign concerning screening, while for Italians this percentage was 71.4%.

In the multivariate analysis, the net odds ratio of the adherence to recommendations for doing Pap test was statistically higher for most SD considered in the analyses (Table 4), especially for educational level, citizenship,

economic difficulties and having received almost one promotion practices out of the three adopted in most of the Italian Regions (counselling made by doctors or health operators, invitation letter sent by the LHU and media campaign promoting the LHU screening program). The greater risk was associated with not having received any promotional intervention (OR 3.5; CI 2.7–4.6), followed by being foreigners (OR 2.0; CI 1.5–2.7) and finally having a lot of economical difficulties (OR 1.7; CI 1.3–2.2). Age and education level decreased their impact on this indicator in presence with all other SD.

It is interesting to note how all the SD here considered remain significant for the Pap test adherence also when all the other variables have been taken into account, i.e., women with foreign citizenship, compared with Italians with the same education level, economical level, etc., present a higher risk of not following the preventive programs as suggested by local and national authorities.

Discussion

These first examples show quite clearly the value of the information that may be derived from a BRFS such as

Table 3 Percentage of respondents who reported the perceived interdiction to smoke always/quite always in public indoor spaces and in work places for regions, PASSI 2007–2008, Italy ($n = 30,387$)

Regions	Geographical areas	In public indoor spaces		In work places	
		%	95% CI	%	95% CI
Trento	North	95.8	94.5–97.1	92.3	91.4–95.4
Friuli-Venezia Giulia	North	94.2	92.7–95.6	89.4	87.1–91.7
Veneto	North	93.1	92.3–94.0	89.9	88.6–91.2
Piemonte	North	92.5	91.7–93.4	89.6	88.4–90.8
Valle D'Aosta	North	92.4	89.1–95.7	91.3	87.1–95.4
Emilia-Romagna	North	92.2	91.2–93.1	86.5	85.0–88.0
Liguria	North	92.1	90.3–94.0	86.8	83.9–89.8
Bolzano	North	91.7	88.0–95.4	93.4	88.1–96.6
Toscana	Centre	90.4	89.2–91.5	87.3	85.6–88.9
Molise	South	90.3	86.4–94.2	89.7	84.4–95.0
Lazio	Centre	86.9	85.2–88.6	83.1	80.8–85.5
Marche	Centre	86.7	83.9–89.4	83.9	80.2–87.5
Abruzzo	Centre	86.5	84.5–88.6	86.8	84.0–89.6
Umbria	Centre	80.1	77.4–82.9	82.7	79.5–85.9
Puglia (south)	South	79.2	75.8–82.5	84.4	80.7–88.2
Basilicata (LHU of Matera)	South	77.6	73.5–81.7	79.5	74.1–84.9
Campania	South	72.1	70.1–74.0	81.2	78.7–83.6
Sicilia	South	69.1	65.5–72.7	77.5	73.0–82.0
LHUs pool	–	85.0	84.3–85.6	85.4	84.6–86.1

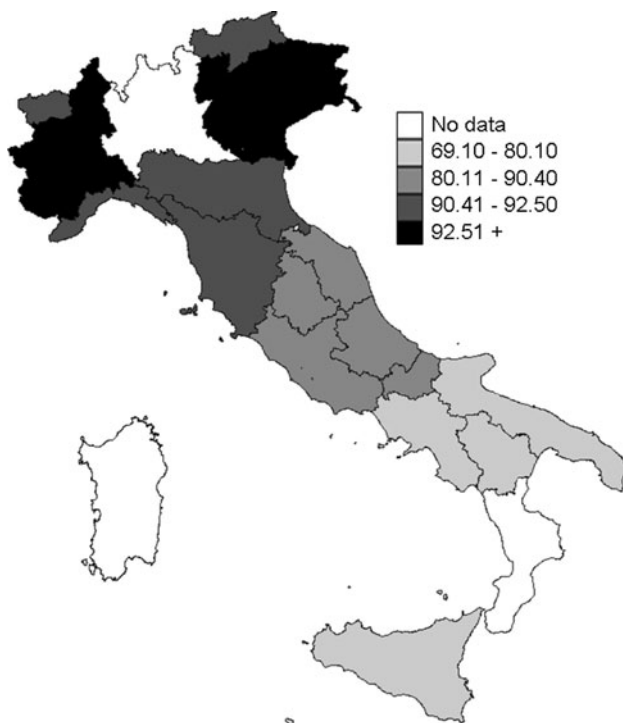


Fig. 1 Geographical distribution of the percentage of respondents who reported the perceived interdiction to smoke always/quite always in public indoor spaces for Italian regions, PASSI 2007–2008 ($n = 30,387$)

PASSI. This illustrates the most important message, particularly for countries that have not yet developed a proper risk factor surveillance system: also a system so “young”,

with all the possible limitations, has the capacity to offer important information useful for public health and health promotion interventions. Existing surveillance systems, perhaps designed not specifically for SD surveillance, can already bring sufficient evidence to state the need for health promotion interventions focused on specific subgroups (Chiu 2003) where the social determinants are of great importance. The value of BRFS systems will be even clearer when in the future changes and trends on these aspects will be observed. Once programs targeted specifically to subgroups needing public health interventions will be carried out, a BRFS such as PASSI will be able to provide precious and unique information on their effectiveness.

From a broader perspective it could be said that BRFS surveillance is not SD surveillance, in a sense that BRFS by itself is not able to offer *all* the information needed for an efficient SD surveillance. Still, we believe that information collected through BRFS systems such as PASSI is a valuable source for understanding SD by itself; and even more if integrated with information coming from other sources that can multiply, boost the information content and value to be used in SD surveillance, so needed for better action in this fundamental area of public health. In fact existing BRFS systems can be highly flexible so that changes can be made in order to better fulfil the information needed on SD, particularly collecting more specific data on SD indicators (as research better defines the types of indicators needed and on programs/interventions targeted to reduced SD-related health inequalities). What we would like to point

Table 4 Prevalence of women aged 25–64 years old who report having made the last Pap test in the last 3 years as a preventive measure, by socio-demographic risk factor, PASSI 2007–2008, Italy ($n = 6,609$)

Characteristic	Adhesion to recommendations for Pap test (%)	Unadjusted odds ratio (95% CI)	Adjusted odds ratio (95% CI) ^a
Total	83.0 (CI 82.0–84.0)	–	–
Age, years			
25–34	78.7	Referent group	Referent group
35–49	87.1	1.8 (1.5–2.2)	1.8 (1.5–2.2)
50–64	81.1	1.2 (1.0–1.4) ^b	1.3 (1.0–1.6) ^b
Educational attainment			
Primary school or less	75.8	Referent group	Referent group
Middle school	81.4	1.4 (1.1–1.7)	1.3 (1.0–1.7)
High school	85.9	2.0 (1.6–2.4)	1.8 (1.4–2.3)
University	84.2	1.7 (1.3–2.2)	1.6 (1.2–2.2)
Citizenship			
Italian	83.9	2.6 (2.0–3.5)	2.0 (1.5–2.7)
Others	65.6	Referent group	Referent group
Economic difficulties			
None	82.6	1.7 (1.4–2.1)	1.5 (1.2–1.9)
Some	85.5	2.1 (1.7–2.6)	1.7 (1.3–2.2)
A lot	73.6	Referent group	Referent group
Received counselling, invitation letter or media campaign			
No	56.3	Referent group	Referent group
Yes	84.5	4.2 (3.3–5.4)	3.5 (2.7–4.6)

^a All variables were included as covariates in multivariate model

^b Not statistically significant (P value >0.05), all other odds ratios are significantly higher than 1 ($P < 0.05$)

out, starting from our experience, is that, in the meantime, data currently gathered by BRFS are already a precious source for information on SD and health that could and should be more used.

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