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ORIGINAL ARTICLE

Local deprivation status and seasonal influenza vaccination coverage in adults ≥ 65 years residing in the Foggia municipality, Italy, 2009-2016

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Keywords

Influenza vaccination • Deprivation index • Socioeconomic status • Elderly

Summary

Introduction. *In Italy, vaccination against seasonal influenza has been recommended for the elderly since 1980, but coverage is still far below the WHO minimum target level of 75%. Effective interventions to improve influenza vaccination should take into account socioeconomic determinants of inequalities in vaccine uptake. This study aimed to assess differences in vaccination coverage, by socioeconomic status, among people ≥ 65 years of age residing in the Foggia municipality, Italy.*
Methods. *A Socio-Economic-Health Deprivation Index (SEHDI) was constructed by using a multivariate analysis model. The resident population, for census block, was classified in 5 deprivation groups. Differences in demographic and socioeconomic indicators, the standardized mortality ratios (SMRs), and the average vaccination coverage among deprivation groups were evaluated with the linear F-test. The association between census variables and influenza vaccination coverage, in each deprivation group, was assessed using the Pearson bivariate correlation.*
Results. *The SEHDI allowed to identify factors related to ageing, housing, household size and composition, and education. Forty percent of people residing in the Foggia municipality lived in conditions of socioeconomic and health deprivation. Belonging to families with 3 or 4 members was associated with increased coverage rates. In the most deprived group, vaccination uptake was positively associated with the dependency ratio.*
Conclusions. *The results of this study have shown that there is still large room for improving influenza vaccination coverage among subjects belonging to the most deprived areas. Surveillance of trends in influenza vaccine uptake by socioeconomic groups is a feasible contribution to implementing effective, tailored to the frail older persons, vaccine utilization programs.*

Introduction

Seasonal influenza is an acute respiratory infection caused by influenza viruses which circulate in all parts of the world. Several studies have shown that, among individuals aged ≥ 65 years, influenza is associated with increased morbidity and mortality and excess hospitalizations, particularly in industrialized countries [1-4].
Vaccination is the most effective method to prevent infection and severe outcomes caused by influenza viruses [5]. Vaccination can reduce illness and lessen the severity of infection, particularly in groups at risk for complications of influenza, such as the elderly and subjects of any age with underlying diseases [6]. The World Health Organization (WHO) recommends annual influenza vaccination for pregnant women, children aged 6-59 months, the elderly, individuals with specific chronic medical conditions and healthcare workers [7]. In 2009, the Council of the European Union issued a recommendation on seasonal influenza vaccination with the aim of reaching a vaccination coverage (VC) rate of 75% among the older age-groups and risk groups, as recommended by the WHO. Member States were also encouraged to improve vaccination coverage among healthcare workers [8].

In Italy, since 1980, influenza vaccination has been recommended for people 65 years of age and older, those with chronic diseases, children under 12 years of age who are receiving long-term anti-inflammatory treatment with aspirin, and those who have frequent contact with high-risk groups [2, 9]. Vaccination coverage among the elderly population formerly showed an increasing trend, reaching 68.7% in the 2005-2006 season. Subsequently, the proportion of vaccinated elderly progressively declined and dropped below 50% during two of the latest influenza seasons [10]. During the 2017-2018 season, vaccination coverage was 52.7% [10, 11], still far below the minimum (75%) or optimal (95%) coverage targets set in the National Vaccination Plan (PNPV) 2017-2019 [11].
In the Apulia region, Southern Italy (≈ 4,000,000 inhabitants), in the first half of the 2000s, influenza vaccination coverage rates in people aged 65 years and over were stably above 68%; they then decreased from 57.2% in the 2012-2013 season to 48.6% in the 2014-2015 season. During the 2017-2018 season, the coverage rate rose to 59.4% [12], with the highest level recorded in the district of Foggia (61%) [13].
A systematic review published in 2013 showed that the access and adherence to seasonal influenza vaccination

among adults aged ≥ 65 years are influenced by social determinants of health, such as age, gender, marital status, education, ethnicity, socioeconomic status, social and cultural values, place of residence, lifestyle habits, social influences, previous vaccination experiences, perceived susceptibility, sources of information and perceived health status [14]. Also healthcare system-related factors, including accessibility, affordability, knowledge, attitudes towards vaccination, and physicians' advice, are important determinants of vaccination. Effective interventions to improve influenza vaccination should therefore take into account determinants that may cause inequalities in vaccine uptake, in order to identify the population groups to which targeted efforts must be addressed [14, 15].

Deprivation indexes have been proposed as useful measures for analyzing health inequalities by identifying and evaluating the relationships between socioeconomic status (SES) and health conditions. These indexes usually refer to geographical aggregations, and are used as a proxy of the individual's conditions according to the area of residence. They can be used to identify disparities in influenza immunization among the various high-risk groups, including the elderly [16, 17].

Because few studies have specifically focused on the role played by deprivation indexes in determining vaccine uptake [18-23], we aimed to assess differences in influenza vaccination coverage among people ≥ 65 years of age belonging to different socioeconomic groups and residing in the Foggia municipality (Apulia region, Italy), according to census district and the variables recorded [24].

Methods

Setting

The Foggia municipality is the administrative center of the homonymous district. Situated in the center of "Italy's granary", it is an important reference point for nearby rural areas [25]. In terms of population, Foggia is the third-largest Apulian municipality, after Bari and Taranto. It is the most densely populated municipality (299.3 inhabitants/sq km) in the Foggia district and has the second-largest territorial extension (507.80 sq km). On 1 January 2017, the population was estimated at 151,726 residents (51.8% women), 20.7% of whom were aged 65 years or older, 65% between 15 and 64 years and 14.3% under 15 years. Since 2012, the proportion of older persons in the total population has grown significantly (+ 4.6% of people aged ≥ 65 years) and the average age has increased by almost 5 years. The old-age-dependency ratio and the aging index have increased by 7.7% and 53.6%, respectively. In 2017, resident foreigners accounted for 4% of the total population (+3% compared with 2003) (Tab. I) [26, 27].

Calculation of the Socio-Economic-Health Deprivation Index (SEHDI)

Variables from the data warehouse of the 15th Italian General Censuses of Population and Housing 2011 were considered [24]. The SEHDI was calculated by using a multivariate analysis model as previously described by Lillini et al. [18]. Standardized mortality ratios (SMRs) for all-cause and some cause-specific mortality, by gender and age-group (0-64 years and 65+ years), were taken from the Apulian Causes of Death Registry for the period 2009-2013 (death certificates coded in accordance with the International Classification of Diseases 10th Revision - ICD10). The resident population, by census district, was classified in 5 deprivation groups: high deprivation, medium-high deprivation, medium deprivation, medium-low deprivation, low deprivation. The chart of the Foggia municipality was constructed by means of the ISTAT (Italian National Institute of Statistics) shapefile format [28].

Data on influenza vaccination uptake in adults aged ≥ 65 years in seven seasons (2009-2010 to 2015-2016) were retrieved from general practitioners' (GPs) medical records of subjects. GPs' offices (n = 124) were georeferenced and vaccination coverage was calculated for each census district.

Differences in the main demographic and socioeconomic indicators (dependency ratio, aging index, replacement index, activity rate, employment and unemployment rates), the SMRs, and the average vaccination coverage among the five deprivation groups were evaluated by means of the linear F-test ($p < 0.05$).

The association between census variables [24] and influenza vaccination coverage, in each deprivation group, was assessed by means of the Pearson bivariate correlation ($p < 0.05$).

Results

Table II shows the census variables composing the SEHDI for the Foggia municipality. The SEHDI allowed us to identify 3 main factors related to aging, housing, household size and composition, and education. Together, these accounted for 69% of the variance.

Forty percent of people residing in the Foggia municipality lived in conditions of socioeconomic and health deprivation (Fig. 1).

Among the main demographic and socioeconomic indicators, dependency ratio, aging index, and replacement index were higher in the most deprived groups ($p < 0.05$ l.), while activity rate was lower. The SMR was higher in the high deprivation group ($p < 0.05$ l.) (Tab. III).

Figure 2 shows the geographical distribution of the SEHDI by census district. The most deprived area was the old part of the city, traditionally inhabited by people of lower socioeconomic status and immigrants.

The SMRs for the period 2009-2013 were higher in the most deprived groups ($p < 0.05$ l.) (Tab. IV).

Tab. I. Main demographic indicators of Foggia municipality, Italy, years 2002-2017, January 1st.

Year	Population (n.)	Population aged 0-14 (%)	Population aged 15-64 (%)	Population aged ≥ 65 (%)	Mean age (years)	Dependency ratio (%)	Old-age-dependency ratio (%)	Aging index (%)	Resident foreigners (n.)
2002	155,188	17.7	66.3	16.1	38.8	50.9	24.2	91	-
2003	154,970	17.5	66.1	16.4	39.1	51.2	24.8	93.9	1,431
2004	154,792	17.2	66.1	16.7	39.4	51.3	25.2	96.9	1,955
2005	154,780	17.0	65.9	17.1	39.8	51.7	25.9	100.5	2,085
2006	153,650	16.8	65.8	17.5	40.1	52	26.5	104.2	1,837
2007	153,529	16.5	65.7	17.7	40.5	52.1	27	107.3	2,045
2008	153,469	16.2	65.9	17.9	40.7	51.8	27.2	110.2	2,732
2009	153,239	16.0	65.9	18.1	41	51.7	27.4	112.8	3,361
2010	152,959	15.9	65.9	18.2	41.3	51.7	27.2	114.9	3,857
2011	148,573	15.7	65.8	18.5	41.6	51.9	28.1	117.5	4,290
2012	147,045	15.5	65.7	18.9	41.9	52.3	28.8	122.2	2,803
2013	148,573	15.2	65.6	19.2	42.2	52.4	29.2	126	3,745
2014	153,143	15.1	65.3	19.6	42.4	53.1	30.0	129.7	5,113
2015	152,770	14.8	65.1	20.0	42.7	53.5	30.7	134.9	5,593
2016	151,991	14.6	65.1	20.4	43	53.7	31.3	139.4	5,612
2017	151,726	14.3	65.0	20.7	43.4	53.9	31.9	144.6	6,140

Tab. II. Census variables [24] composing the SEHDI for the Foggia municipality, Italy.

Factor 1 = 38.1%	Factor 2 = 16.1%	Factor 3 = 14.6%
Housing with bathtub or shower (%)	Housing with bathtub or shower (%)	Housing with bathtub or shower (%)
Widowers/widows (%)	Primary school diploma, illiterate (%)	
2-member families (%)		
Average number of people per family		
Aging index (%)		
Total variance explained = 68.9%		

Fig. 1. Distribution of population residing in the Foggia municipality, Italy, by deprivation group [24].

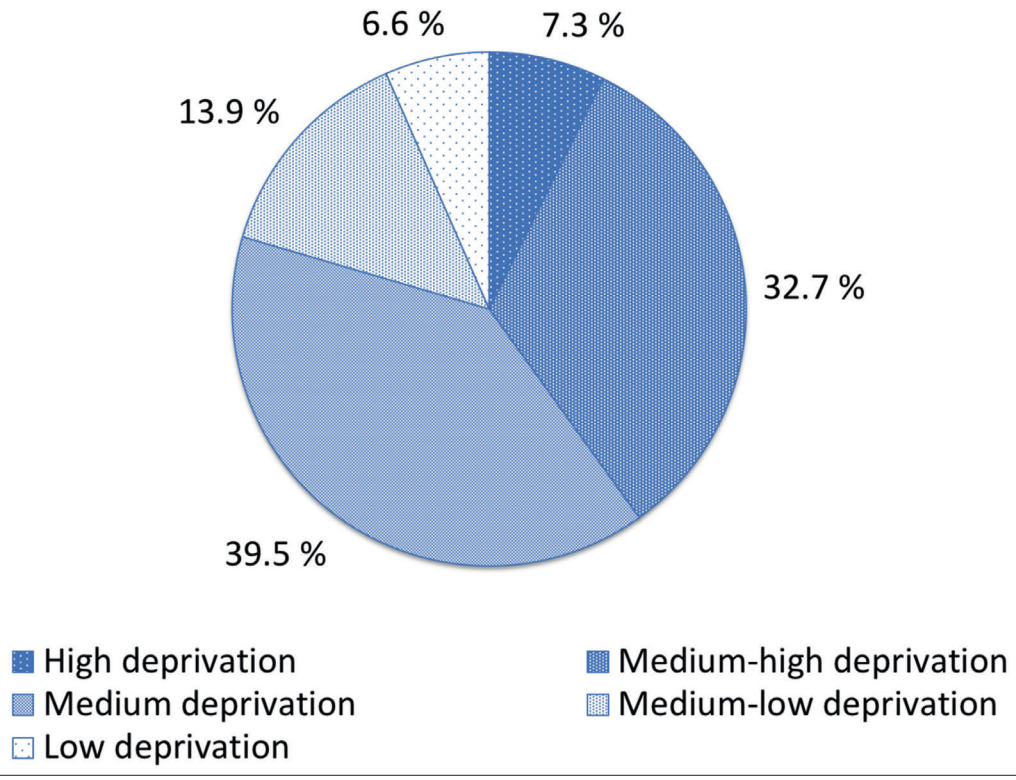
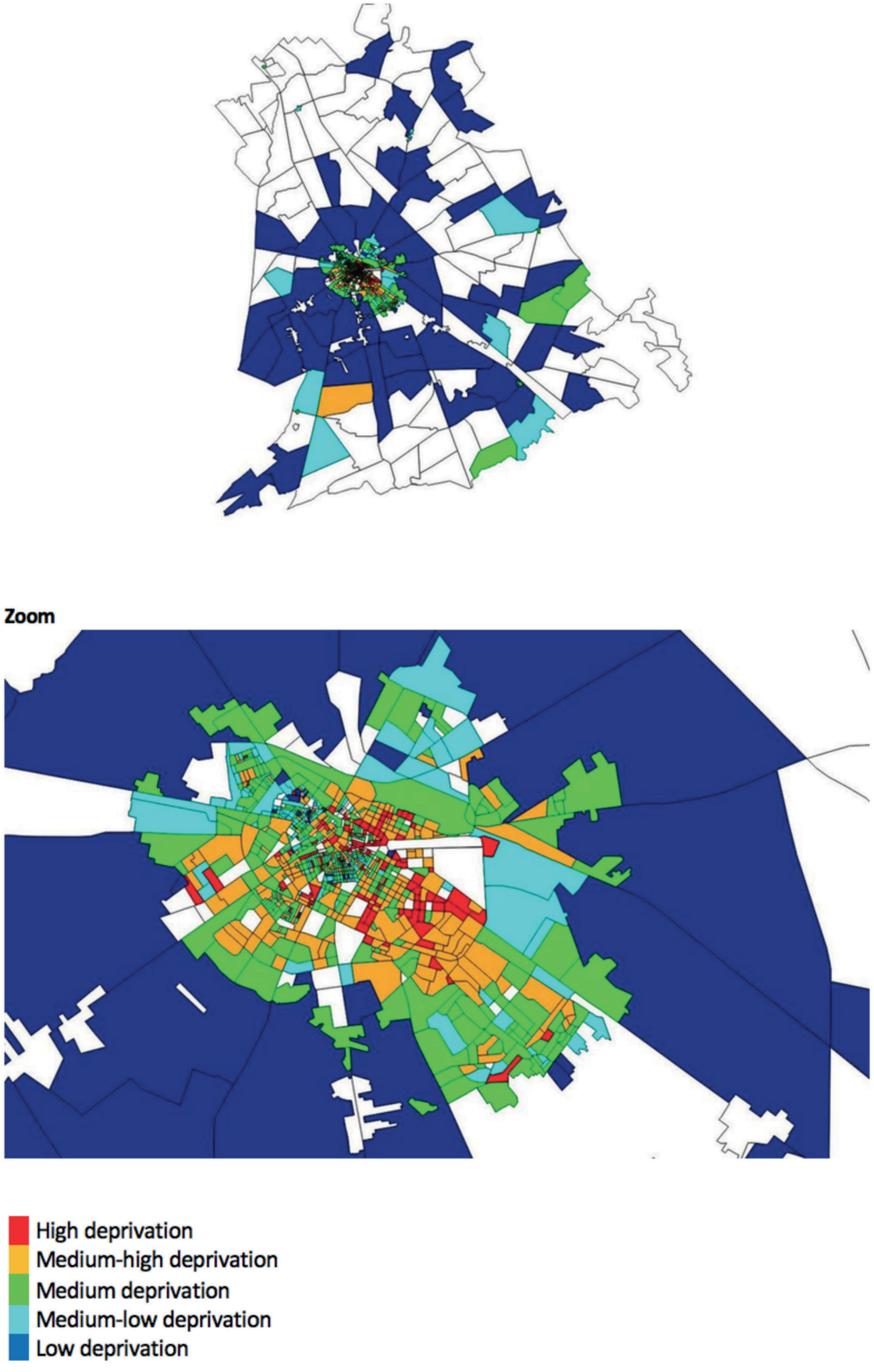


Fig. 2. Geographical distribution of the SEHDI in the Foggia municipality, Italy [24].



Tab. III. Main demographic and socioeconomic indicators[24], and SMRs[2009-2013] in the Foggia municipality, Italy, by deprivation group.

Deprivation group	Dependency ratio (%)	Aging index (%)	Replacement Index (%)	Activity rate (%)	Employment rate (%)	Unemployment rate (%)	SMR
High deprivation	71.7	383.1	185.4	41.3	52.7	8.9	1.14
Medium-high deprivation	60.0	215.0	155.7	42.4	47.8	10.2	0.83
Medium deprivation	53.3	135.4	139.3	44.7	45.5	11.1	0.63
Medium-low deprivation	51.6	97.2	102.3	44.7	41,6	11.5	0.82
Low deprivation	60.1	83.2	92.1	46.9	45.3	11.0	0.57
Total	**57.8**	**177.3**	**139.7**	**43.8**	**46.3**	**10.6**	**0.8**
Trend	*p < 0.05 l.*	*p < 0.05 l.*	*p < 0.05 l.*	*p < 0.05 l.*	*NS*	*NS*	*p < 0.05 l.*

Tab. IV. SMRs[2009-2013] for all-cause and some cause-specific mortality in the Foggia municipality, Italy, by deprivation group.

Deprivation group	All-cause mortality	Diseases of the circulatory system	Diseases of the respiratory system	Diseases of the digestive system	Chronic Obstructive Pulmonary Disease (COPD)	Influenza and pneumonia
	SMR (95%CI)	SMR (95% CI)	SMR (95% CI)	SMR (95% CI)	SMR (95% CI)	SMR (95% CI)
High deprivation	1.59 (1.48-1.71)	1.67 (1.48-1.87)	1.45 (1.04-1.86)	1.28 (0.78-1.78)	1.04 (0.6-1.47)	4.12 (2.16-6.08)
Medium-high deprivation	1.19 (1.14-1.23)	1.19 (1.12-1.27)	1.04 (0.88-1.21)	1.55 (1.28-1.81)	0.69 (0.52-0.86)	2.13 (1.46-2.80)
Medium deprivation	0.83 (0.79-0.86)	0.83 (0.77-0.89)	0.81 (0.68-0.94)	0.90 (0.72-1.08)	0.63 (0.49-0.78)	1.68 (1.14-2.22)
Medium-low deprivation	0.77 (0.72-0.83)	0.75 (0.65-0.84)	0.81 (0.59-1.03)	0.89 (0.58-1.19)	0.72 (0.46-0.98)	1.55 (0.67-2.43)
Low deprivation	0.20 (0.16-0.24)	0.21 (0.14-0.29)	0.07 (0-1.16)	0.34 (0.07-0.61)	0.10 (0-0.24)	0 (0-0)
Total	**0.95 (0.93-0.97)**	**0.96 (0.92-1)**	**0.88 (0.80-0.97)**	**1.1 (0.97-1.23)**	**0.66 (0.56-0.75)**	**1.88 (1.52-2.24)**
Trend	*p < 0.05 l.*	*p < 0.05 l.*	*p < 0.05 l.*	*p < 0.05 l.*	*p < 0.05 l.*	*p < 0.05 l.*

Tab. V. SMRs[2009-2013] for all-cause and some cause-specific mortality in persons ≥65 years of age residing in the Foggia municipality, Italy, by deprivation group.

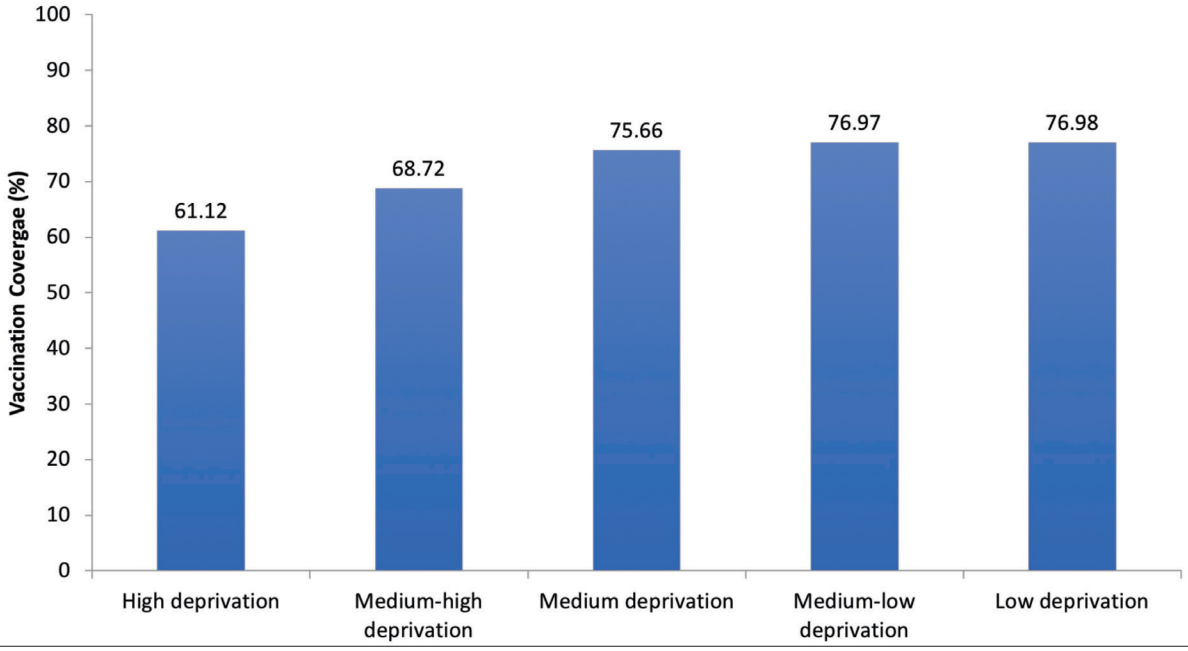
Deprivation group	All-cause mortality	Diseases of the respiratory system	Chronic Obstructive Pulmonary Disease (COPD)	Influenza and pneumonia
	SMR (95% CI)	SMR (95% CI)	SMR (95% CI)	SMR (95% CI)
High deprivation	0.99 (0.91-1.06)	0.93 (0.67-1.20)	0.67 (0.39-0.95)	2.56 (1.30-3.81)
Medium-high deprivation	0.92 (0.88-0.96)	0.83 (0.70-0.97)	0.54 (0.41-0.68)	1.72 (1.16-2.27)
Medium deprivation	0.92 (0.88-0.97)	0.93 (0.77-1.09)	0.74 (0.57-0.91)	1.94 (1.28-2.60)
Medium-low deprivation	0.98 (0.90-1.07)	1.13 (0.81-1.44)	1.04 (0.67-1.41)	1.95 (0.74-3.15)
Low deprivation	0.29 (0.89-0.94)	0 (0-0)	0.10 (0-0.24)	0 (0-0)
Total	**0.91 (0.89-0.94)**	**0.87 (0.79-0.96)**	**0.65 (0.56-0.75)**	**1.85 (1.48-2.22)**
Trend	*p < 0.05 n.l.*	*p < 0.05 n.l.*	*p < 0.05 n.l.*	*NS*

A non-linear trend was observed in the SMRs for all-cause and some cause-specific mortality, except for Influenza and pneumonia, in the 65+ age-group (Tab. V). Mortality data, by sex, age and deprivation group, are shown in Table S1.

During seven influenza seasons (2009-2010 to 2015-2016), vaccination coverage in the elderly population residing in the Foggia municipality was 71.9% on average, with rates above the minimum (75%) coverage target recorded in the least deprived groups ($p < 0.05$ l.) (Fig. 3).

Residing in an area with a higher proportion of divorced persons or immigrants was associated with a lower vaccination uptake, while belonging to families with 3 or 4 members was associated with higher coverage rates (Tab. VI). In the most deprived group, vaccination uptake was positively associated with the dependency ratio (Tab. VII).

Fig. 3. Influenza vaccination coverage (averages in seven seasons: 2009-2010 to 2015-2016) in persons ≥65 years of age residing in Foggia municipality, Italy, by deprivation group.



Tab. VI. Associations between census variables[24] and influenza vaccine uptake in persons ≥65 years of age residing in the Foggia municipality, Italy.

Census variable	Pearson correlation coefficient	P value
3-member families (%)	0.156	0.014
4-member families (%)	0.167	0.012
Divorced (%)	-0.199	0.006
Foreigners and stateless persons residing in Italy (%)	-0.172	0.011

Tab. VII. Associations between census variables[24] and influenza vaccine uptake in persons ≥65 years of age residing in the Foggia municipality, Italy, by deprivation group.

Census variable	Pearson correlation coefficient	P value
High deprivation group		
Dependency ratio (%)	0.631	0.012
Employees (%)	-0.374	0.017
Foreigners and stateless persons residing in Italy (%)	-0.356	0.019
Medium-high deprivation group		
Unemployed (%)	0.210	0.017
Entrepreneurs (%)	-0.225	0.014
Unpaid family workers (%)	-0.200	0.019
Single-parent families (%)	-0.243	0.011
Medium deprivation group		
Married (%)	0.291	0.015
Replacement Index (%)	0.332	0.01
Divorced (%)	-0.475	0.014
Self-employed (%)	-0.429	0.029
Medium-low deprivation group	No association	
Low deprivation group	No association	

Discussion

Preventing serious complications of seasonal influenza among the elderly remains a public health priority and has a major economic and social impact.

Life expectancy considerably increased in most developed countries during the twentieth century, and by 2050 it is expected that 30% of Europeans will be aged > 60 years and at least 10% ≥ 80 years [29]. However, the increase in longevity (and in health) is very unevenly distributed across groups with different socioeconomic status [30], and health inequalities seem to be increasing over time [31].

In agreement with other studies [29], ours showed that the census variables composing the SEHDI for the Foggia

municipality, Italy, included aging and household size and composition, which are considered to be among the main determinants of the well-being of older adults.

Research on the relationship between health inequalities and social deprivation in older people is scant. Some studies have suggested that there is only a weak association between social deprivation and ill health, or that there is a lower mortality differential between older people living in affluent areas and those in deprived areas [32]. In the Foggia municipality, we found that some main demographic and socioeconomic indicators (such as dependency ratio, aging index, and replacement index) were higher in the most deprived groups.

Some authors claim that accessibility to healthcare facilities influences health service utilization [18, 31]; health outcomes may therefore be related to the spatial distribution of such services [31, 33]. In our study, the most deprived area was the old part of the city, farther from healthcare services and with more difficult access to public transport

Our results also support those of other studies, in that all-cause and cause-specific mortality was found to be higher among the most disadvantaged groups [18, 34]. A study of socioeconomic inequalities in health and mortality in 22 European countries showed that, in almost all countries, death rates were substantially higher in groups of lower socioeconomic status [35]. In particular, our results are consistent with the finding of that a lower mortality due to diseases of the respiratory and circulatory systems was associated with higher socioeconomic status [18, 36, 37].

We found excess deaths from influenza and pneumonia among the deprived groups. Zhao et al. showed that, during the 2009/2010 pandemic and the first post-pandemic influenza season in England, persons living in areas with the highest level of deprivation had a significantly higher risk of death following influenza A(H1N1)pdm09 than residents in areas with the lowest level, in both periods [38]. Khieu et al. found that people living in the most deprived areas experienced the highest estimated influenza-attributable all-cause mortality rate, which was 1.8 times greater than that found in the least deprived areas [39]. These findings support the notion that influenza vaccination should be targeted to the most vulnerable groups living in the most deprived areas.

Our study showed that a lower socioeconomic status of the elderly population residing in the Foggia municipality was associated with a lower influenza vaccination uptake. Other studies on socioeconomic disparities in influenza vaccination have reported similar results. For instance, Landi et al. found that the presence of economic problems was significantly associated with a reduced likelihood of being vaccinated [40]. Similarly, Norbury et al. found that people living in more deprived areas were less likely than their wealthier counterparts to be immunized over two different influenza seasons [41]. By contrast, Damiani et al. reported that socioeconomic inequalities in influenza vaccine uptake were present among adults but not among the elderly, perhaps because the National Health Service in Italy provides influenza vaccination for the elderly free of charge [19].

Finally, our finding of a positive association between vaccination uptake and household size and composition supports the hypothesis that social disadvantages, such as isolation and low income, may hinder access to the healthcare system among elderly people [40].

Conclusions

Although influenza vaccination coverage among the least deprived groups living in the Foggia municipality was above the objective of vaccinating at least 75% of the population aged 65 years or older, our study, like others, revealed that there is still ample room for improvement among subjects belonging to the most deprived groups. The surveillance of trends in influenza vaccination uptake by socioeconomic groups can contribute to reducing health inequalities and implementing effective vaccination programs that are tailored to frail older persons.

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Conflict of interest statement

None declared.

Authors' contributions

FF conceived the study, analyzed and interpreted the data, and drafted the manuscript. GI, AC, MDP, FVP, SC, and MDT contributed to data analysis and to drafting the manuscript. DM contributed to conceiving the study and revised the manuscript. RP provided important intellectual input in the various steps of the study and edited the manuscript. All authors have read and approved the final manuscript.

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Supplementary Materials

Tab. S1. SMRs[2009-2013] for all-cause and some cause-specific mortality in the Foggia municipality, Italy, by sex, age and deprivation group.

	All-cause mortality								
	Males aged 0-64	Females aged 0-64	Total population aged 0-64	Males aged ≥ 65	Females aged ≥ 65	Total population aged ≥ 65	Total, males	Total, females	Total population
Deprivation group	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**
High deprivation	1.25 (0.88-1.63)	1.86 (1.27-2.45)	1.48 (1.16-1.8)	1.01 (0.89-1.12)	0.97 (0.87-1.07)	0.99 (0.91-1.06)	1.59 (1.42-1.76)	1.59 (1.44-1.75)	1.59 (1.48-1.71)
Medium-high deprivation	1.18 (1.02-1.34)	1.16 (0.95-1.37)	1.17 (1.04-1.3)	0.92 (0.86-0.97)	0.92 (0.87-0.97)	0.92 (0.88-0.96)	1.24 (1.17-1.31)	1.13 (1.07-1.2)	1.19 (1.14-1.23)
Medium deprivation	0.95 (0.82-1.07)	1.04 (0.86-1.21)	0.98 (0.88-1.08)	0.85 (0.79-0.91)	1 (0.93-1.06)	0.92 (0.88-0.97)	0.83 (0.78-0.88)	0.83 (0.78-0.88)	0.83 (0.79-0.86)
Medium-low deprivation	1.03 (0.81-1.24)	0.93 (0.65-1.21)	0.99 (0.82-1.16)	0.87 (0.76-0.98)	1.1 (0.98-1.22)	0.98 (0.9-1.07)	0.76 (0.68-0.84)	0.79 (0.71-0.87)	0.77 (0.72-0.83)
Low deprivation	0.35 (0.17-0.53)	0.23 (0.03-0.42)	0.31 (0.17-0.44)	0.25 (0.16-0.34)	0.35 (0.23-0.48)	0.29 (0.22-0.37)	0.21 (0.15-0.27)	0.19 (0.13-0.25)	0.2 (0.16-0.24)
Total	**1 (0.92-1.08)**	**1.06 (0.94-1.17)**	**1.02 (0.95-1.09)**	**0.87 (0.84-0.91)**	**0.95 (0.91-0.99)**	**0.91 (0.89-0.94)**	**0.96 (0.92-0.99)**	**0.94 (0.91-0.98)**	**0.95 (0.93-0.97)**
Trend	*p<0.05 l.*	*p<0.05 l.*	*p<0.05 l.*	*p<0.05 l.*	*p<0.05 n.l.*	*p<0.05 n.l.*	*p<0.05 l.*	*p<0.05 l.*	*p<0.05 l.*
	Diabetes mellitus								
	Males aged 0-64	Females aged 0-64	Total population aged 0-64	Males aged ≥ 65	Females aged ≥ 65	Total population aged ≥ 65	Total, males	Total, females	Total population
Deprivation group	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**
High deprivation	1.1 (0-3.25)	0 (0-0)	0.71 (0-2.11)	0.95 (0.39-1.52)	0.17 (0-0.34)	0.43 (0.21-0.64)	1.43 (0.62-2.24)	0.28 (0.01-0.55)	0.7 (0.36-1.04)
Medium-high deprivation	0.44 (0-1.06)	0.84 (0-2)	0.58 (0.01-1.15)	0.71 (0.46-0.95)	0.43 (0.29-0.58)	0.53 (0.4-0.66)	0.85 (0.56-1.13)	0.56 (0.37-0.74)	0.67 (0.51-0.83)
Medium deprivation	0.98 (0.19-1.76)	1.6 (0.2-3)	1.19 (0.48-1.89)	0.65 (0.39-0.9)	0.73 (0.51-0.96)	0.7 (0.53-0.87)	0.61 (0.39-0.83)	0.65 (0.46-0.83)	0.63 (0.49-0.77)
Medium-low deprivation	1.32 (0-2.81)	0.91 (0-2.68)	1.18 (0.02-2.34)	0.8 (0.28-1.32)	0.7 (0.3-1.1)	0.74 (0.42-1.05)	0.68 (0.29-1.06)	0.52 (0.24-0.8)	0.59 (0.36-0.82)
Low deprivation	0 (0-0)	0 (0-0)	0 (0-0)	0.21 (0-0.62)	0 (0-0)	0.09 (0-0.28)	0.12 (0-0.34)	0 (0-0)	0.05 (0-0.15)
Total	**0.8 (0.35-1.25)**	**1.05 (0.32-1.77)**	**0.88 (0.5-1.27)**	**0.7 (0.54-0.86)**	**0.51 (0.4-0.61)**	**0.58 (0.49-0.67)**	**0.72 (0.57-0.87)**	**0.53 (0.43-0.64)**	**0.61 (0.52-0.69)**
Trend	*NS*	*NS*	*NS*	*p<0.05 n.l.*	*p<0.05 l.*	*p<0.05 l.*	*p<0.05 l.*	*p<0.05 l.*	*p<0.05 l.*
	Diseases of the circulatory system								
	Males aged 0-64	Females aged 0-64	Total population aged 0-64	Males aged ≥ 65	Females aged ≥ 65	Total population aged ≥ 65	Total, males	Total, Females	Total population
Deprivation group	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**
High deprivation	1.56 (0.64-2.49)	2.43 (0.63-4.23)	1.81 (0.98-2.65)	1.07 (0.86-1.27)	1 (0.85-1.15)	1.02 (0.9-1.15)	1.63 (1.33-1.93)	1.7 (1.45-1.95)	1.67 (1.48-1.87)
Medium-high deprivation	0.98 (0.65-1.31)	0.92 (0.42-1.42)	0.96 (0.69-1.24)	0.96 (0.86-1.06)	0.95 (0.87-1.03)	0.95 (0.89-1.02)	1.19 (1.07-1.31)	1.19 (1.09-1.29)	1.19 (1.12-1.27)
Medium deprivation	1.03 (0.74-1.32)	1.62 (1.04-2.21)	1.2 (0.93-1.46)	0.89 (0.79-0.99)	1.01 (0.91-1.1)	0.96 (0.89-1.03)	0.8 (0.71-0.89)	0.86 (0.78-0.94)	0.83 (0.77-0.89)
Medium-low deprivation	1.08 (0.6-1.57)	0.92 (0.18-1.66)	1.04 (0.63-1.44)	0.84 (0.66-1.03)	1.12 (0.94-1.31)	1 (0.87-1.14)	0.67 (0.54-0.81)	0.81 (0.68-0.94)	0.75 (0.65-0.84)
Low deprivation	0.11 (0-0.34)	0 (0-0)	0.08 (0-0.25)	0.3 (0.13-0.47)	0.48 (0.27-0.69)	0.39 (0.26-0.53)	0.18 (0.08-0.28)	0.24 (0.14-0.35)	0.21 (0.14-0.29)

Tab. S1. SMRs[2009-2013] for all-cause and some cause-specific mortality in the Foggia municipality, Italy, by sex, age and deprivation group.

	Diseases of the circulatory system								
	Males aged 0-64	Females aged 0-64	Total population aged 0-64	Males aged ≥ 65	Females aged ≥ 65	Total population aged ≥ 65	Total, males	Total, Females	Total population
Total	**0.99 (0.81-1.17)**	**1.24 (0.92-1.57)**	**1.06 (0.9-1.22)**	**0.91 (0.84-0.97)**	**0.98 (0.92-1.03)**	**0.95 (0.91-0.99)**	**0.92 (0.86-0.98)**	**0.99 (0.94-1.05)**	**0.96 (0.92-1)**
Trend	***p<0.05 n.l.***	***NS***	***p<0.05 l.***	***p<0.05 l.***	***p<0.05 n.l.***	***p<0.05 n.l.***	***p<0.05 l.***	***p<0.05 l.***	***p<0.05 l.***
	Diseases of the respiratory system								
	Males aged 0-64	Females aged 0-64	Total population aged 0-64	Males aged ≥ 65	Females aged ≥ 65	Total population aged ≥ 65	Total, males	Total, females	Total population
Deprivation group	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**
High deprivation	0 (0-0)	1.9 (0-5.62)	0.63 (0-1.85)	0.85 (0.5-1.2)	1.02 (0.61-1.43)	0.93 (0.67-1.2)	1.24 (0.73-1.75)	1.72 (1.05-2.39)	1.45 (1.04-1.86)
Medium-high deprivation	0.94 (0.12-1.77)	0.39 (0-1.15)	0.76 (0.15-1.37)	0.84 (0.66-1.01)	0.83 (0.63-1.04)	0.83 (0.7-0.97)	1.06 (0.84-1.27)	1.02 (0.77-1.27)	1.04 (0.88-1.21)
Medium deprivation	1.38 (0.53-2.24)	0.59 (0-1.41)	1.13 (0.49-1.77)	0.89 (0.69-1.08)	1 (0.74-1.26)	0.93 (0.77-1.09)	0.81 (0.64-0.97)	0.81 (0.6-1.02)	0.81 (0.68-0.94)
Medium-low deprivation	0.75 (0-1.78)	0.84 (0-2.48)	0.78 (0-1.65)	1.02 (0.64-1.41)	1.29 (0.75-1.82)	1.13 (0.81-1.44)	0.74 (0.47-1.02)	0.92 (0.54-1.29)	0.81 (0.59-1.03)
Low deprivation	1.51 (0-3.59)	0 (0-0)	1.05 (0-2.51)	0 (0-0)	0 (0-0)	0 (0-0)	0.11 (0-0.25)	0 (0-0)	0.07 (0-0.16)
Total	**1.08 (0.59-1.57)**	**0.61 (0.07-1.14)**	**0.93 (0.56-1.3)**	**0.84 (0.73-0.95)**	**0.93 (0.78-1.07)**	**0.87 (0.79-0.96)**	**0.86 (0.75-0.97)**	**0.92 (0.78-1.05)**	**0.88 (0.8-0.97)**
Trend	***NS***	***NS***	***NS***	***p<0.05 n.l.***	***p<0.05 n.l.***	***p<0.05 n.l.***	***p<0.05 l.***	***p<0.05 l.***	***p<0.05 l.***
	Influenza and pneumonia								
	Males aged 0-64	Females aged 0-64	Total population aged 0-64	Males aged ≥ 65	Females aged ≥ 65	Total population aged ≥ 65	Total, males	Total, Females	Total population
Deprivation group	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**
High deprivation	0 (0-0)	8.67 (0-25.66)	3.89 (0-11.5)	2.62 (0.52-4.71)	2.52 (0.96-4.08)	2.56 (1.3-3.81)	3.66 (0.73-6.59)	4.43 (1.81-7.04)	4.12 (2.16-6.08)
Medium-high deprivation	2.85 (0-6.8)	0 (0-0)	1.58 (0-3.77)	2.18 (1.2-3.15)	1.41 (0.76-2.06)	1.72 (1.16-2.27)	2.76 (1.58-3.94)	1.68 (0.9-2.46)	2.13 (1.46-2.8)
Medium deprivation	3.13 (0-6.68)	1.35 (0-4.01)	2.36 (0.05-4.67)	2.17 (1.1-3.23)	1.76 (0.92-2.6)	1.94 (1.28-2.6)	1.99 (1.09-2.88)	1.45 (0.78-2.12)	1.68 (1.14-2.22)
Medium-low deprivation	2.82 (0-8.35)	3.83 (0-11.35)	3.25 (0-7.76)	2.22 (0.27-4.17)	1.73 (0.21-3.25)	1.95 (0.74-3.15)	1.74 (0.35-3.14)	1.4 (0.28-2.52)	1.55 (0.67-2.43)
Low deprivation	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)
Total	**2.57 (0.51-4.63)**	**1.66 (0-3.54)**	**2.18 (0.75-3.6)**	**2.13 (1.51-2.74)**	**1.65 (1.19-2.11)**	**1.85 (1.48-2.22)**	**2.17 (1.58-2.76)**	**1.66 (1.22-2.11)**	**1.88 (1.52-2.24)**
Trend	***NS***	***NS***	***NS***	***NS***	***NS***	***NS***	***p<0.05 l.***	***p<0.05 l.***	***p<0.05 l.***
	Chronic Obstructive Pulmonary Disease (COPD)								
	Males aged 0-64	Females aged 0-64	Total population aged 0-64	Males aged ≥ 65	Females aged ≥ 65	Total population aged ≥ 65	Total, males	Total, females	Total population
Deprivation group	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**
High deprivation	0 (0-0)	0 (0-0)	0 (0-0)	0.61 (0.27-0.96)	0.74 (0.28-1.21)	0.67 (0.39-0.95)	0.92 (0.4-1.44)	1.23 (0.47-2)	1.04 (0.6-1.47)

Tab. S1. SMRs[2009-2013] for all-cause and some cause-specific mortality in the Foggia municipality, Italy, by sex, age and deprivation group.

	Chronic Obstructive Pulmonary Disease (COPD)								
	Males aged 0-64	**Females aged 0-64**	**Total population aged 0-64**	**Males aged ≥ 65**	**Females aged ≥ 65**	**Total population aged ≥ 65**	**Total, males**	**Total, females**	**Total population**
Medium-high deprivation	0.43 (0-1.26)	1.3 (0-3.84)	0.64 (0-1.53)	0.56 (0.39-0.73)	0.51 (0.3-0.72)	0.54 (0.41-0.68)	0.71 (0.5-0.92)	0.66 (0.39-0.93)	0.69 (0.52-0.86)
Medium deprivation	0.94 (0-1.99)	0 (0-0)	0.71 (0-1.52)	0.71 (0.51-0.92)	0.8 (0.49-1.1)	0.74 (0.57-0.91)	0.63 (0.45-0.81)	0.64 (0.39-0.89)	0.63 (0.49-0.78)
Medium-low deprivation	0 (0-0)	0 (0-0)	0 (0-0)	0.83 (0.43-1.24)	1.43 (0.68-2.18)	1.04 (0.67-1.41)	0.58 (0.3-0.87)	1 (0.48-1.53)	0.72 (0.46-0.98)
Low deprivation	3.39 (0-8.1)	0 (0-0)	2.63 (0-6.28)	0 (0-0)	0 (0-0)	0 (0-0)	0.15 (0-0.36)	0 (0-0)	0.1 (0-0.24)
Total	**0.77 (0.15-1.38)**	**0.41 (0-1.2)**	**0.68 (0.18-1.19)**	**0.62 (0.51-0.74)**	**0.7 (0.54-0.86)**	**0.65 (0.56-0.75)**	**0.63 (0.52-0.75)**	**0.7 (0.54-0.86)**	**0.66 (0.56-0.75)**
Trend	***NS***	***NS***	***NS***	***p<0.05 n.l.***	***NS***	***p<0.05 n.l.***	***p<0.05 l.***	***p<0.05 l.***	***p<0.05 l.***
	Diseases of the digestive system								
	Males aged 0-64	**Females aged 0-64**	**Total population aged 0-64**	**Males aged ≥ 65**	**Females aged ≥ 65**	**Total population aged ≥ 65**	**Total, males**	**Total, females**	**Total population**
Deprivation group	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**
High deprivation	0 (0-0)	3.82 (0-8.15)	1.04 (0-2.22)	0.65 (0.17-1.13)	0.94 (0.46-1.42)	0.82 (0.48-1.17)	0.76 (0.2-1.33)	1.73 (0.93-2.53)	1.28 (0.78-1.78)
Medium-high deprivation	1.84 (1.01-2.67)	1.04 (0.02-2.06)	1.62 (0.96-2.29)	1.27 (0.93-1.62)	1.17 (0.87-1.46)	1.21 (0.99-1.44)	1.67 (1.28-2.05)	1.43 (1.08-1.78)	1.55 (1.28-1.81)
Medium deprivation	1.13 (0.58-1.69)	0.8 (0.02-1.58)	1.05 (0.59-1.5)	0.78 (0.49-1.08)	1.24 (0.89-1.59)	1.02 (0.79-1.25)	0.8 (0.56-1.04)	1 (0.73-1.27)	0.9 (0.72-1.08)
Medium-low deprivation	1.53 (0.47-2.6)	2.25 (0.05-4.46)	1.72 (0.75-2.69)	1.05 (0.43-1.66)	0.86 (0.33-1.4)	0.95 (0.54-1.36)	0.98 (0.54-1.43)	0.78 (0.37-1.19)	0.89 (0.58-1.19)
Low deprivation	0.39 (0-1.14)	1.18 (0-3.48)	0.58 (0-1.39)	0.68 (0-1.45)	0.25 (0-0.75)	0.48 (0.01-0.95)	0.43 (0.01-0.84)	0.24 (0-0.58)	0.34 (0.07-0.61)
Total	**1.28 (0.9-1.66)**	**1.3 (0.67-1.94)**	**1.29 (0.96-1.61)**	**0.99 (0.79-1.18)**	**1.1 (0.91-1.29)**	**1.05 (0.92-1.18)**	**1.07 (0.9-1.25)**	**1.13 (0.95-1.31)**	**1.1 (0.97-1.23)**
Trend	***NS***	***NS***	***NS***	***p<0.05 n.l.***	***p<0.05 n.l.***	***p<0.05 l.***	***p<0.05 n.l.***	***p<0.05 l.***	***p<0.05 l.***
	Malignant neoplasms								
	Males aged 0-64	**Females aged 0-64**	**Total population aged 0-64**	**Males aged ≥ 65**	**Females aged ≥ 65**	**Total population aged ≥ 65**	**Total, males**	**Total, females**	**Total population**
Deprivation group	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**
High deprivation	1.34 (0.74-1.94)	1.89 (1.1-2.68)	1.59 (1.1-2.07)	1.07 (0.85-1.28)	1.13 (0.89-1.36)	1.09 (0.94-1.25)	1.58 (1.29-1.87)	1.82 (1.48-2.16)	1.69 (1.47-1.91)
Medium-high deprivation	1.1 (0.85-1.34)	1.35 (1.05-1.65)	1.21 (1.02-1.4)	1.04 (0.93-1.15)	0.87 (0.75-0.98)	0.97 (0.89-1.05)	1.28 (1.16-1.4)	1.14 (1.01-1.27)	1.22 (1.13-1.31)
Medium deprivation	0.88 (0.69-1.06)	0.99 (0.77-1.22)	0.93 (0.78-1.07)	0.96 (0.84-1.07)	0.93 (0.79-1.07)	0.95 (0.86-1.03)	0.85 (0.76-0.94)	0.83 (0.73-0.93)	0.84 (0.77-0.91)
Medium-low deprivation	0.62 (0.36-0.88)	0.76 (0.43-1.09)	0.68 (0.47-0.89)	0.96 (0.76-1.17)	1.16 (0.87-1.44)	1.04 (0.87-1.21)	0.7 (0.56-0.83)	0.82 (0.65-1)	0.75 (0.64-0.85)
Low deprivation	0.4 (0.1-0.69)	0.24 (0-0.51)	0.33 (0.13-0.54)	0.28 (0.11-0.45)	0.32 (0.06-0.57)	0.29 (0.15-0.43)	0.23 (0.12-0.34)	0.19 (0.07-0.31)	0.22 (0.13-0.3)
Total	**0.9 (0.77-1.02)**	**1.08 (0.93-1.23)**	**0.97 (0.88-1.07)**	**0.97 (0.91-1.04)**	**0.93 (0.85-1.01)**	**0.96 (0.91-1.01)**	**0.97 (0.91-1.03)**	**0.97 (0.9-1.04)**	**0.97 (0.93-1.02)**
Trend	***p<0.05 l.***	***p<0.05 l.***	***p<0.05 l.***	***p<0.05 l.***	***p<0.05 n.l.***	***p<0.05 l.***	***p<0.05 l.***	***p<0.05 l.***	***p<0.05 l.***

Tab. S1. SMRs[2009-2013] for all-cause and some cause-specific mortality in the Foggia municipality, Italy, by sex, age and deprivation group.

	Malignant neoplasms of lip, oral cavity and pharynx								
	Males aged 0-64	Females aged 0-64	Total population aged 0-64	Males aged ≥ 65	Females aged ≥ 65	Total population aged ≥ 65	Total, males	Total, females	Total population
Deprivation group	SMR (95% CI)	SMR (95% CI)	SMR (95% CI)	SMR (95% CI)	SMR (95% CI)	SMR (95% CI)	SMR (95% CI)	SMR (95% CI)	SMR (95% CI)
High deprivation	0 (0-0)	0 (0-0)	0 (0-0)	1.24 (0-3.67)	0 (0-0)	0.79 (0-2.34)	0.64 (0-1.9)	0 (0-0)	0.45 (0-1.34)
Medium-high deprivation	2.1 (0.42-3.78)	1.68 (0-3.58)	1.94 (0.67-3.2)	1.63 (0.2-3.06)	0.67 (0-2)	1.32 (0.26-2.37)	1.52 (0.62-2.42)	1.07 (0-2.28)	1.39 (0.66-2.12)
Medium deprivation	1.03 (0.02-2.03)	1.28 (0-2.73)	1.12 (0.29-1.95)	0.77 (0-1.84)	0 (0-0)	0.54 (0-1.29)	0.66 (0.13-1.19)	0.61 (0-1.46)	0.65 (0.2-1.1)
Medium-low deprivation	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)	5.98 (0-14.28)	1.78 (0-4.25)	0 (0-0)	1.78 (0-4.25)	0.45 (0-1.09)
Low deprivation	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)	8.84 (0-26.18)	2.25 (0-6.67)	0 (0-0)	1.94 (0-5.74)	0.47 (0-1.4)
Total	**1.05 (0.4-1.71)**	**1.05 (0.21-1.89)**	**1.05 (0.54-1.57)**	**1.05 (0.32-1.78)**	**1.14 (0.02-2.26)**	**1.08 (0.47-1.69)**	**0.79 (0.43-1.16)**	**0.96 (0.29-1.62)**	**0.84 (0.51-1.16)**
Trend	***NS***	***NS***	***NS***	***NS***	***NS***	***NS***	***NS***	***p<0.05 l.***	***p<0.05 l.***
	Malignant neoplasm of stomach								
	Males aged 0-64	Females aged 0-64	Total population aged 0-64	Males aged ≥ 65	Females aged ≥ 65	Total population aged ≥ 65	Total, males	Total, females	Total population
Deprivation group	SMR (95% CI)	SMR (95% CI)	SMR (95% CI)	SMR (95% CI)	SMR (95% CI)	SMR (95% CI)	SMR (95% CI)	SMR (95% CI)	SMR (95% CI)
High deprivation	0 (0-0)	0 (0-0)	0 (0-0)	1.21 (0.15-2.28)	1.33 (0.16-2.5)	1.27 (0.48-2.06)	1.45 (0.18-2.72)	1.75 (0.22-3.27)	1.58 (0.6-2.57)
Medium-high deprivation	1.06 (0.02-2.1)	0.78 (0-1.85)	0.95 (0.19-1.7)	0.96 (0.47-1.44)	0.58 (0.15-1.01)	0.79 (0.46-1.12)	1.19 (0.65-1.72)	0.65 (0.2-1.1)	0.95 (0.59-1.31)
Medium deprivation	0.97 (0.12-1.82)	0.89 (0-1.9)	0.94 (0.29-1.59)	1.13 (0.56-1.7)	1.54 (0.73-2.34)	1.3 (0.82-1.77)	0.99 (0.56-1.43)	1.05 (0.52-1.58)	1.02 (0.68-1.35)
Medium-low deprivation	2.1 (0.04-4.16)	3.36 (0.07-6.65)	2.58 (0.79-4.37)	1.24 (0.15-2.33)	0.73 (0-1.75)	1.04 (0.27-1.8)	1.24 (0.43-2.05)	0.61 (0.08-1.3)	0.98 (0.43-1.54)
Low deprivation	0 (0-0)	0 (0-0)	0 (0-0)	1.18 (0-2.82)	0 (0-0)	0.77 (0-1.83)	0.57 (0-1.35)	0 (0-0)	0.35 (-0.13-0.82)
Total	**1.04 (0.47-1.6)**	**1.09 (0.38-1.81)**	**1.06 (0.62-1.5)**	**1.08 (0.76-1.41)**	**0.98 (0.62-1.34)**	**1.04 (0.8-1.28)**	**1.09 (0.8-1.38)**	**0.84 (0.55-1.14)**	**0.99 (0.78-1.2)**
Trend	***NS***	***NS***	***NS***	***p<0.05 n.l.***	***NS***	***p<0.05 n.l.***	***p<0.05 n.l.***	***p<0.05 l.***	***p<0.05 l.***
	Malignant colorectal neoplasms								
	Males aged 0-64	Females aged 0-64	Total population aged 0-64	Males aged ≥ 65	Females aged ≥ 65	Total population aged ≥ 65	Total, males	Total, females	Total population
Deprivation group	SMR (95% CI)	SMR (95% CI)	SMR (95% CI)	SMR (95% CI)	SMR (95% CI)	SMR (95% CI)	SMR (95% CI)	SMR (95% CI)	SMR (95% CI)
High deprivation	4.5 (0.9-8.09)	1.97 (0-4.7)	3.4 (1.05-5.76)	1.84 (0.94-2.74)	0.94 (0.33-1.55)	1.37 (0.83-1.9)	3.14 (1.83-4.46)	1.45 (0.55-2.35)	2.3 (1.5-3.1)
Medium-high deprivation	1.67 (0.68-2.65)	2.22 (0.91-3.53)	1.9 (1.11-2.7)	1.48 (1.07-1.89)	1.07 (0.7-1.43)	1.28 (1-1.56)	1.84 (1.38-2.31)	1.45 (1.01-1.88)	1.65 (1.34-1.97)
Medium deprivation	0.89 (0.27-1.5)	1.38 (0.48-2.29)	1.1 (0.58-1.62)	1.14 (0.75-1.54)	1.16 (0.72-1.59)	1.15 (0.86-1.44)	0.98 (0.68-1.28)	0.98 (0.65-1.32)	0.98 (0.76-1.21)
Medium-low deprivation	0.3 (0-0.89)	0.44 (0-1.29)	0.36 (0-0.85)	1.41 (0.61-2.21)	1.43 (0.54-2.32)	1.42 (0.83-2.01)	0.88 (0.4-1.36)	0.93 (0.38-1.47)	0.9 (0.54-1.26)

Tab. S1. SMRs(2009-2013) for all-cause and some cause-specific mortality in the Foggia municipality, Italy, by sex, age and deprivation group.

	Malignant colorectal neoplasms								
	Males aged 0-64	**Females aged 0-64**	**Total population aged 0-64**	**Males aged ≥ 65**	**Females aged ≥ 65**	**Total population aged ≥ 65**	**Total, males**	**Total, females**	**Total population**
Low deprivation	0 (0-0)	1.82 (0-4.33)	0.73 (0-1.73)	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)	0.37 (0-0.88)	0.16 (0-0.38)
Total	**1.19 (0.73-1.64)**	**1.57 (0.96-2.19)**	**1.35 (0.98-1.72)**	**1.33 (1.08-1.58)**	**1.08 (0.84-1.32)**	**1.21 (1.04-1.39)**	**1.32 (1.1-1.54)**	**1.13 (0.91-1.35)**	**1.23 (1.07-1.39)**
Trend	*p<0.05 l.*	*NS*	*p<0.05 l.*	*p<0.05 l.*	*p<0.05 l.*	*p<0.05 n.l.*	*p<0.05 l.*	*p<0.05 l.*	*p<0.05 l.*
	Lung neoplasms								
	Males aged 0-64	**Females aged 0-64**	**Total population aged 0-64**	**Males aged ≥ 65**	**Females aged ≥ 65**	**Total population aged ≥ 65**	**Total, males**	**Total, Females**	**Total population**
Deprivation group	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**	**SMR (95% CI)**
High deprivation	1.13 (0.02-2.23)	0.55 (0-1.64)	0.93 (0.12-1.75)	0.97 (0.52-1.42)	1.5 (0.46-2.53)	1.09 (0.67-1.5)	1.2 (0.7-1.7)	2.04 (0.71-3.37)	1.36 (0.88-1.84)
Medium-high deprivation	1.14 (0.64-1.64)	1.47 (0.67-2.28)	1.25 (0.83-1.68)	1.03 (0.8-1.27)	1.04 (0.56-1.52)	1.03 (0.82-1.25)	1.09 (0.87-1.31)	1.47 (0.93-2.02)	1.16 (0.95-1.37)
Medium deprivation	1 (0.6-1.4)	1.21 (0.58-1.85)	1.07 (0.73-1.41)	1.17 (0.9-1.44)	0.92 (0.4-1.44)	1.13 (0.88-1.37)	0.88 (0.7-1.06)	0.95 (0.54-1.36)	0.89 (0.73-1.05)
Medium-low deprivation	0.45 (0.01-0.89)	0.74 (0-1.57)	0.54 (0.14-0.94)	0.77 (0.37-1.17)	1.03 (0.02-2.03)	0.81 (0.44-1.19)	0.47 (0.25-0.68)	0.79 (0.16-1.42)	0.52 (0.31-0.73)
Low deprivation	0.68 (0-1.45)	0.51 (0-1.51)	0.63 (0.01-1.25)	0.52 (0.01-1.04)	0 (0-0)	0.45 (0.01-0.89)	0.37 (0.1-0.65)	0 (0-0)	0.31 (0.08-0.55)
Total	**0.94 (0.69-1.19)**	**1.13 (0.74-1.53-)**	**1.01 (0.79-1.22)**	**1.02 (0.87-1.17)**	**1.03 (0.72-1.34)**	**1.02 (0.89-1.16)**	**0.87 (0.76-0.98)**	**1.13 (0.85-1.41)**	**0.92 (0.81-1.02)**
Trend	*p<0.05 n.l.*	*p<0.05 n.l.*	*p<0.05 n.l.*	*p<0.05 n.l.*	*p<0.05 l.*	*p<0.05 l.*	*p<0.05 l.*	*p<0.05 l.*	*p<0.05 l.*
	Malignant neoplasms of breast								
		Females aged 0-64			**Females aged ≥ 65**			**Total, females**	
Deprivation group		**SMR (95% CI)**			**SMR (95% CI)**			**SMR (95% CI)**	
High deprivation		1.39 (0.03-2.75)			1.08 (0.44-1.72)			1.47 (0.72-2.21)	
Medium-high deprivation		1.99 (1.25-2.72)			0.85 (0.54-1.17)			1.27 (0.94-1.6)	
Medium deprivation		1.36 (0.82-1.89)			1.01 (0.62-1.41)			0.98 (0.71-1.25)	
Medium-low deprivation		1.07 (0.28-1.87)			1.62 (0.7-2.54)			1.08 (0.59-1.56)	
Low deprivation		0 (0-0)			0.4 (0-1.18)			0.12 (0-0.37)	
Total		**1.42 (1.07-1.77)**			**0.99 (0.77-1.22)**			**1.07 (0.9-1.25)**	
Trend		*p<0.05 l.*			*p<0.05 n.l.*			*p<0.05 l.*	
	Malignant neoplasms of prostate								
	Males aged 0-64			**Males aged ≥ 65**			**Total, males**		
Deprivation group	**SMR (95% CI)**			**SMR (95% CI)**			**SMR (95% CI)**		
High deprivation	0 (0-0)			1.01 (0-41-1.61)			1.54 (0.63-2.45)		

Tab. S1. SMRs[2009-2013] for all-cause and some cause-specific mortality in the Foggia municipality, Italy, by sex, age and deprivation group.

	Malignant neoplasms of prostate								
	Males aged 0-64			**Males aged ≥ 65**			**Total, males**		
Medium-high deprivation	0.71 (0.2-11)			1.11 (0.79-1.43)			1.42 (1.01-1.82)		
Medium deprivation	1.04 (0-2.49)			0.89 (0.57-1.20)			0.79 (0.52-1.06)		
Medium-low deprivation	1.41 (0-4.18)			1.41 (0.70-2.12)			1.07 (0.54-1.59)		
Low deprivation	0 (0-0)			0.22 (0-0.66)			0.14 (0-0.4)		
Total	**0.86 (0.02-1.7)**			**1.02 (0.82-1.21)**			**1.04 (0.84-1.23)**		
Trend	***NS***			***p<0.05 l.***			***p<0.05 l.***		

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