

# An Italian survey on the attitudes and beliefs of public health professionals towards mandatory vaccination: a pilot study

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## ABSTRACT

**Background:** This pilot study aimed to test a questionnaire developed to assess the attitudes and beliefs of Italian public health professionals towards mandatory vaccination for school-aged children.

**Methods:** The online questionnaire was administered to members of the Italian Society of Hygiene, Preventive Medicine and Public Health. Internal consistency was measured using Cronbach's alpha.

**Results:** Fifty-two people answered the questionnaire: 90.4% were in favour of mandatory vaccination. Overall, the alpha score was above the cut-off value of 0.70.

**Conclusion:** The questionnaire has proved a valid tool for assessing the attitudes and beliefs of Italian public health professionals towards mandatory vaccination.

*Key words:* Mandatory Vaccination, Public Health Professional, Childhood Vaccination, Survey

## INTRODUCTION

In recent years, Italy has faced a decrease in childhood vaccination coverage. From 2013, immunization coverage for polio, diphtheria, tetanus and hepatitis B began to fall below the 95% target (1). National measles-mumps-rubella immunization coverage, already below the 95% threshold, started declining further after 2011 and this factor contributed to measles outbreaks in 2016 and 2017 (2,3).

In response to this, in 2017 Italy introduced a new vaccination law that made ten vaccines (those against diphtheria, tetanus, poliomyelitis, hepatitis B, pertussis, *Haemophilus influenzae* type b, measles, mumps, rubella, and varicella) mandatory for children aged 0-16 years, all free of charge. In accordance with the law, unvaccinated children are no longer admitted into pre-school and parents of unvaccinated children attending compulsory schooling have to pay financial penalties (4).

Even if available data suggest that the new law has increased vaccination coverage, the scientific and ethical debate on mandatory vaccination is still open (5). To investigate this matter, we are conducting a survey of a sample of Italian public health professionals. This paper describes the pilot phase of the survey, which aimed to test the practicability and reliability of the survey questionnaire.

## METHODS

A specific questionnaire was designed to assess the attitudes and beliefs of public health professionals towards mandatory vaccination. It consists of 46 questions grouped into five sections (see supplement): I. Socio-demographic information (eight questions); II. Political and health system orientation (two questions); III. Personal and professional experience with vaccinations (three questions plus two conditional questions); IV. Attitudes and beliefs towards mandatory vaccination (eleven questions plus five conditional questions); V. Perception of the epidemiologic, social and economic impact of mandatory vaccination (fifteen questions). The perceived impact of mandatory vaccination was assessed through a five-point Likert scale, while the other sections were assessed through closed-ended questions, some of which allowed multiple answers. An information letter including the details of the study and an internet link for the survey was e-mailed to a convenience sample of 73 members of the SItI (Italian Society of Hygiene, Preventive medicine and Public Health - Società Italiana di Igiene, Medicina Preventiva e Sanità Pubblica) in May 2019 (6). The information letter explained that answering the questionnaire would constitute consent to participate in the study. Ethical approval was not required for an anonymous questionnaire administered to experts.

Statistical analysis was performed with Stata version 15.0 software (Stata Corporation, College Station, TX,

USA). All data were processed anonymously. A descriptive analysis was performed using frequencies, percentages, mean values, SD and ranges. Where appropriate, the questionnaire's reliability was evaluated by calculating Cronbach's alpha as a measure of internal consistency: a cut-off of 0.70 was taken to indicate sufficient reliability (7). Where needed, the Spearman-Brown reliability correction for test length was used (8).

## RESULTS

Of the 73 people invited to participate in the pilot study, 52 completed the questionnaire, a response rate of 71% (Table 1). Their age ranged from 30 to 69 years (mean:  $48.5 \pm 12$  years) and 57.7% were male. Participants were distributed all over the country, with the majority in Central Italy (53.8%). They were mostly medical doctors (86.5 %) working in universities (55.8%) or public health services (26.9%); moreover, 71.2% of respondents were directly involved with vaccinations in their professional activity.

With regard to attitudes, the vast majority of respondents were positive about mandatory vaccination: 90.4% endorsed it in general; 84.6% were in favour of the 2017 mandatory vaccination law in Italy and 65.4% were against its repeal (Table 2). Moreover, 82.7% of respondents were against the most recent legislative proposal for a "flexible" mandatory vaccination, where vaccinations would be made mandatory only when the coverage rate falls markedly. The internal consistency analysis performed for the six items on attitudes towards mandatory vaccination gave an alpha score of 0.74, above the cut-off value of 0.70 (Table S1).

In terms of beliefs, all the mandatory vaccines were considered to be of great importance by at least 80% of respondents (Table S2). According to the sample, the best strategies to ensure optimal vaccination coverage in Italy were promotion and information campaigns for the general population (57.7%), followed by mandatory vaccination (46.1%) and organizational interventions for vaccination services (34.6%) (Table S2). Nevertheless, implementing vaccination strategies other than mandatory vaccination in Italy was considered difficult by the majority of respondents (75%), as was ensuring vaccination coverage in the absence of mandatory vaccination (86.5%) (Table S2). The internal consistency analysis performed for the four questions relating to beliefs towards mandatory vaccination resulted in an alpha score of 0.85, above the cut-off value of 0.70 (Table S1).

Regarding the impact of mandatory vaccination, different aspects were studied. On the epidemiologic side, nearly 95% of the sample agreed that mandatory vaccination is able to increase vaccination coverage; on the social side, nearly 60% of the sample agreed that

**TABLE 1. Socio-demographic characteristics of the survey sample (total=52)**

|   |                  |       |
|---|------------------|-------|
| <b>Gender, n, % of total</b>  |                  |       |
| Male  | 30               | 57.7  |
| Female  | 22               | 42.3  |
| <b>Age (years), average (sd), range</b>                               | 48.5 ( $\pm$ 12) | 30-69 |
| <b>Region, n, % of total</b>  |                  |       |
| Northern Italy  | 13               | 25.0  |
| Central Italy   | 28               | 53.8  |
| Southern Italy and Islands  | 11               | 21.2  |
| <b>Academic degree, n, % of total</b>                                 |                  |       |
| Graduate  | 14               | 27.0  |
| Post-graduate   | 38               | 73.0  |
| <b>Area of degree, n, % of total</b>                                  |                  |       |
| Medicine  | 45               | 86.5  |
| Biology   | 4                | 7.7   |
| Other   | 3                | 5.8   |
| <b>Sector of work, n, % of total</b>                                  |                  |       |
| Academic  | 29               | 55.8  |
| Public Health Services  | 14               | 26.9  |
| Hospital  | 4                | 7.7   |
| Government  | 0                | 0     |
| Technical/Research Institute  | 2                | 3.8   |
| Other   | 3                | 5.8   |
| <b>Professional activity dealing with vaccinations, n, % of total</b> |                  |       |
| No  | 15               | 28.8  |
| Yes   | 37               | 71.2  |
| Delivery  | 5                | 13.6  |
| Organization  | 8                | 21.6  |
| Research  | 12               | 32.4  |
| Education   | 8                | 21.6  |
| Other   | 4                | 10.8  |
| <b>If yes, years of experience with vaccinations, average, range</b>  | 14.6 ( $\pm$ 12) | 1-40  |

mandatory vaccination encourages hesitant parents to vaccinate their children, but almost the same proportion of respondents agreed that it strengthens the anti-vaccine movement; on the economic side, nearly 80% agreed that mandatory vaccination will result in cost savings for the National Health Service; finally, the respondents were divided about the impact of the law on vaccination services, e.g. 46.1% of respondents agreed that mandatory vaccination has resulted in an excessive workload for vaccination services staff, while 30.8% disagreed and

23.1% were uncertain (Table S3). The internal consistency analysis resulted in an alpha score above the cut-off value of 0.70 for the epidemiologic impact (0.75), the social impact (0.75) and the impact on vaccination services (0.77). An alpha score under the cut-off value was observed for the economic impact (0.54), probably due to the small number of items (two). In fact, the Spearman-Brown reliability correction for test length showed that if this section had had five items, the alpha score would have jumped to 0.75.

**TABLE 2. Attitudes of public health professionals towards mandatory vaccination (total=52)**

| ATTITUDES  | N %       |           |           |
|--|-----------|-----------|-----------|
|  | YES       | NO        | UNCERTAIN |
| In favour of mandatory vaccination                               | 47 (90.4) | 4 (7.7)   | 1 (1.9)   |
| In favour of the 2017 mandatory vaccination law                  | 44 (84.6) | 7 (13.5)  | 1 (1.9)   |
| Repeal the 2017 mandatory vaccination law?                       | 15 (28.8) | 34 (65.4) | 3 (5.8)   |
| In favour of "flexible" mandatory vaccination                    | 5 (9.6)   | 43 (82.7) | 4 (7.7)   |
| Would extend MMR mandatory vaccination to other groups           | 31 (59.6) | 12 (23.1) | 9 (17.3)  |
| Would modify the 2017 mandatory vaccination law by:*             |           |           |           |
| Removing some mandatory vaccines                                 | 10 (19.2) |           |           |
| Adding some mandatory vaccines                                   | 12 (23.1) |           |           |
| Changing the penalties   | 17 (32.7) |           |           |
| Changing the concerned age group                                 | 10 (19.3) |           |           |
| No change  | 16 (30.8) |           |           |
| * Multiple answers allowed<br>MMR: measles mumps rubella vaccine |           |           |           |

**TABLE S1. Cronbrach's alpha**

| ATTITUDES   | SIGN | ALPHA  |
|---|------|--------|
| In favour of MV   | +    | 0.6871 |
| In favour of the Italian 2017 MV law                                | +    | 0.6218 |
| In favour of MV repeal  | -    | 0.6701 |
| In favour of "flexible" MV  | -    | 0.7258 |
| In favour of extending MMR MV to other population groups            | +    | 0.7423 |
| In favour of including more mandatory vaccines                      | +    | 0.7555 |
| <i>Test scale</i>   |      | 0.7407 |
| BELIEFS   | SIGN | ALPHA  |
| Importance of poliomyelitis vaccine                                 | +    | 0.8230 |
| Importance of diphtheria vaccine                                    | +    | 0.8118 |
| Importance of tetanus vaccine                                       | +    | 0.8225 |
| Importance of pertussis vaccine                                     | +    | 0.8216 |
| Importance of hepatitis B vaccine                                   | +    | 0.8351 |
| Importance of <i>Haemophilus influenzae</i> type b vaccine          | +    | 0.8286 |
| Importance of measles vaccine                                       | +    | 0.8198 |
| Importance of rubella vaccine                                       | +    | 0.8168 |
| Importance of mumps vaccine   | +    | 0.8085 |
| Importance of varicella vaccine                                     | +    | 0.8089 |
| MV is the best strategy for ensuring optimal vaccination coverage   | +    | 0.8641 |
| It is difficult to implement alternative strategies to MV           | +    | 0.8588 |
| It is difficult to ensure vaccination coverage in the absence of MV | +    | 0.8499 |
| <i>Test scale</i>   |      | 0.8407 |

TABLE S1. Cronbrach's alpha

| EPIDEMIOLOGIC IMPACT   | SIGN | ALPHA  |
|--|------|--------|
| MV increases vaccination coverage for VPD  | +    | /      |
| MV reduces VPD morbidity   | +    | /      |
| <i>Test scale</i>  |      | 0.7499 |
| SOCIAL IMPACT  |      |        |
| MV increases citizens' confidence in vaccines  | +    | 0.6573 |
| MV encourages hesitant parents to vaccinate their children   | +    | 0.6685 |
| MV strengthens anti-vaccine movements  | -    | 0.7457 |
| MV damages relations between the State, health institutions and citizens                             | -    | 0.6940 |
| MV represents a failure of the Italian public health system  | -    | 0.7153 |
| MV repeal would create confusion among citizens  | +    | 0.7828 |
| <i>Test scale</i>  |      | 0.7499 |
| ECONOMIC IMPACT  |      |        |
| MV has significantly increased costs for vaccination services  | -    | /      |
| Overall, MV will result in cost savings for the National Health Service                              | +    | /      |
| <i>Test scale</i>  |      | 0.5393 |
| <i>Test scale with Spearman-Brown reliability correction (increased length = 5)</i>                  |      | 0.745  |
| IMPACT ON VACCINATION SERVICES   |      |        |
| The organizational effort for MV is unsustainable for vaccination services                           | -    | 0.7062 |
| MV has resulted in an excessive workload for vaccination services staff                              | -    | 0.6782 |
| MV has caused inconvenience to vaccination services users  | -    | 0.7101 |
| MV was sustained by increased resources devoted to vaccination services                              | +    | 0.7884 |
| MV has diverted resources away from other vaccination-related activities                             | -    | 0.7494 |
| <i>Test scale</i>  |      | 0.7708 |
| MV: mandatory vaccination<br>MMR: measles mumps rubella vaccine<br>VPD: vaccine-preventable diseases |      |        |

TABLE S2. Beliefs of public health professionals towards mandatory vaccination

A: Importance of mandatory vaccines (total = 52)

|                                 | N %           |                  |                      |                |                     |
|---------------------------------|---------------|------------------|----------------------|----------------|---------------------|
|                                 | Not important | Weakly important | Moderately important | Very important | Extremely important |
| Poliomyelitis                   | 1 (1.9)       | 0                | 1 (1.9)              | 7 (13.5)       | 43 (82.7)           |
| Diphtheria                      | 0             | 1 (1.9)          | 0                    | 11 (21.2)      | 40 (76.9)           |
| Anti-tetanus                    | 1 (1.9)       | 0                | 2 (3.9)              | 11 (21.2)      | 38 (73.0)           |
| Pertussis                       | 0             | 0                | 2 (3.9)              | 13 (25.0)      | 37 (71.1)           |
| Hepatitis B                     | 1 (1.9)       | 0                | 0                    | 7 (13.5)       | 44 (84.6)           |
| <i>Haemophilus influenzae b</i> | 0             | 1 (1.9)          | 3 (5.8)              | 14 (26.9)      | 34 (65.4)           |
| Measles                         | 0             | 0                | 2 (3.9)              | 10 (19.2)      | 40 (76.9)           |
| Rubella                         | 0             | 1 (1.9)          | 1 (1.9)              | 12 (23.1)      | 38 (73.1)           |
| Mumps                           | 1 (1.9)       | 0                | 6 (11.6)             | 13 (25.0)      | 32 (61.5)           |
| Varicella                       | 0             | 2 (3.9)          | 8 (15.3)             | 17 (32.7)      | 25 (48.1)           |

**TABLE S2. Beliefs of public health professionals towards mandatory vaccination**  
**B: Alternative strategies to mandatory vaccination (total = 52)**

|   | N (%)     |
|---|-----------|
| <b>The best strategies for ensuring optimal vaccination coverage in Italy are:*</b>           |           |
| Mandatory vaccination   | 24 (46.1) |
| Promotion and information campaigns for the general population                                | 30 (57.7) |
| Information and training campaigns for healthcare professionals                               | 11 (21.2) |
| Organizational interventions aimed at strengthening vaccination services                      | 18 (34.6) |
| Implementation of the national vaccination registry   | 13 (25)   |
| Financial incentives for parents  | 3 (5.8)   |
| Financial incentives for health professionals   | 1 (1.9)   |
| <b>It is difficult to implement alternative strategies to mandatory vaccination</b>           |           |
| Not at all  | 1 (1.9)   |
| Slightly  | 0         |
| Moderately  | 12 (23.1) |
| Very  | 35 (67.3) |
| Extremely   | 4 (7.7)   |
| <b>It is difficult to ensure vaccination coverage in the absence of mandatory vaccination</b> |           |
| Not at all  | 0         |
| Slightly  | 3 (5.8)   |
| Moderately  | 4 (7.7)   |
| Very  | 27 (51.9) |
| Extremely   | 18 (34.6) |
| <b>Main barrier to the implementation of alternative strategies:</b>                          |           |
| Lack of resources   | 17 (32.7) |
| Organizational issues   | 25 (48.1) |
| Lack of political will  | 3 (5.8)   |
| Uncertain   | 1 (1.9)   |
| Other   | 6 (11.5)  |
| *Multiple answers allowed   |           |

**TABLE S3. Perceived impact of mandatory vaccination among public health professional (total = 52)**

|  | N (%)             |           |                            |           |                |
|--|-------------------|-----------|----------------------------|-----------|----------------|
|  | Strongly disagree | Disagree  | Neither agree nor disagree | Agree     | Strongly agree |
| <b>Epidemiologic impact</b>                                      |                   |           |                            |           |                |
| Mandatory vaccination increases vaccination coverage for VPD     | 1 (1.9)           | 0         | 1 (1.9)                    | 17 (32.7) | 33 (63.5)      |
| Mandatory vaccination reduces VPD morbidity                      | 1 (1.9)           | 2 (3.9)   | 4 (7.7)                    | 20 (38.5) | 25 (48.0)      |
| <b>Social impact</b>   |                   |           |                            |           |                |
| Mandatory vaccination increases citizens' confidence in vaccines | 4 (7.7)           | 19 (36.5) | 10 (19.2)                  | 14 (26.9) | 5 (9.6)        |

**TABLE S3. Perceived impact of mandatory vaccination among public health professional (total = 52)**

|   | N (%)             |           |                            |           |                |
|---|-------------------|-----------|----------------------------|-----------|----------------|
|   | Strongly disagree | Disagree  | Neither agree nor disagree | Agree     | Strongly agree |
| <b>Social impact</b>  |                   |           |                            |           |                |
| Mandatory vaccination encourages hesitant parents to vaccinate their children                 | 3 (5.8)           | 10 (19.2) | 8 (15.4)                   | 24 (46.1) | 7 (13.5)       |
| Mandatory vaccination strengthens anti-vaccine movements                                      | 0                 | 12 (23.0) | 8 (15.4)                   | 21 (40.4) | 11 (21.2)      |
| Mandatory vaccination damages relations between the State, health institutions and citizens   | 8 (15.4)          | 27 (51.9) | 8 (15.4)                   | 5 (9.6)   | 4 (7.7)        |
| Mandatory vaccination represents a failure of the Italian public health system                | 6 (11.5)          | 16 (30.8) | 5 (9.6)                    | 21 (40.4) | 4 (7.7)        |
| Mandatory vaccination repeal would create confusion among citizens                            | 2 (3.9)           | 4 (7.7)   | 6 (11.5)                   | 21 (40.4) | 19 (36.5)      |
| <b>Economic impact</b>  |                   |           |                            |           |                |
| Mandatory vaccination has significantly increased the costs for vaccination services          | 7 (13.5)          | 17 (32.7) | 14 (26.9)                  | 10 (19.2) | 4 (7.7)        |
| Overall, mandatory vaccination will result in cost savings for the National Health Service    | 0                 | 2 (3.9)   | 9 (17.3)                   | 21 (40.4) | 20 (38.4)      |
| <b>Impact on vaccination services</b>   |                   |           |                            |           |                |
| The organizational effort for mandatory vaccination is unsustainable for vaccination services | 3 (5.8)           | 24 (46.1) | 14 (26.9)                  | 9 (17.3)  | 2 (3.9)        |
| Mandatory vaccination has resulted in an excessive workload for vaccination services staff    | 1 (1.9)           | 15 (28.9) | 12 (23.1)                  | 19 (36.5) | 5 (9.6)        |
| Mandatory vaccination has caused inconvenience to vaccination services users                  | 1 (1.9)           | 18 (34.7) | 15 (28.8)                  | 15 (28.8) | 3 (5.8)        |
| Mandatory vaccination was sustained by increased resources devoted to vaccination services    | 5 (9.6)           | 16 (30.8) | 17 (32.7)                  | 13 (25.0) | 1 (1.9)        |
| Mandatory vaccination has diverted resources away from other vaccination-related activities   | 3 (5.8)           | 20 (38.4) | 15 (28.8)                  | 12 (23.1) | 2 (3.9)        |
| VPD vaccine preventable diseases  |                   |           |                            |           |                |

## DISCUSSION

The questionnaire has proved practical and reliable for assessing attitudes and beliefs towards mandatory vaccination. Only one section resulted in an alpha score below the selected cut-off value, but this could be explained by the low number of items in the respective category; therefore, we decided to use this section unchanged in the final survey (9). Nonetheless, we used the comments provided by respondents to improve the clarity of some questions. The final survey was launched in July 2017 and the analysis of the results is currently ongoing.

This pilot study showed that Italian public health professionals have very positive attitudes towards mandatory

vaccination. These preliminary results are consistent with the findings of two previous studies conducted on Italian healthcare workers, which showed that family pediatricians and vaccination service employees were against the abrogation of mandatory vaccination (10,11), and with the results of a more recent study addressing Italian Public Health residents, which showed that they agreed with mandatory vaccination and considered it an effective tool for increasing vaccination coverage (12). Nevertheless, to the best of our knowledge, our study will be the first to address the opinion of public health professionals on this topic.

In the pilot phase, public health professionals from different backgrounds were selected to guarantee the representativeness of the SItI members. The small sample size

did not allow an analysis of the determinants of attitudes and beliefs towards mandatory vaccination, but this will be explored in the final survey.

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### Conflict of Interest

The authors have declared that no conflicts of interest exist.

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