

## REVIEW

by **Prof. Mariela Stefanova Kamburova, MD, PhD**

Vice-Rector for Research and Development

Head of the Department of Social Medicine and Health Management

Faculty of Public Health, Medical University – Pleven

on the dissertation thesis entitled:

**“Effectiveness of Influenza Vaccines in Preventing Morbidity among Adults over 80 Years of Age”,**

developed by **Pavel Muter**, Field of Higher Education: 7. Healthcare and Sports, Professional Field 7.4 Public Health, PhD Program “Public Health Management”,

with scientific supervisor **Prof. Tsonko Paunov Paunov**, MD, Medical University “Prof. Dr. Paraskev Stoyanov” – Varna.

### **Procedural Issues**

By Order No. R-109-505/10.12.2025 of the Rector of the Medical University – Varna, I was appointed as a member of the Scientific Jury, and by decision of the first meeting of the Scientific Jury I was designated as a reviewer of the dissertation thesis developed by Pavel Muter for the award of the educational and scientific degree “Doctor (PhD)” in the field of higher education 7. Healthcare and Sports, professional field 7.4 Public Health, doctoral program “Public Health Management.”

### **Educational and Professional Development**

Pavel Muter was born on 02.04.1977 in the city of Vitebsk, Belarussia.

In 2004 he graduated from the Hadassah – Hebrew University School of Nursing with a BBA degree.

In 2008 he obtained an MSc in Advanced Clinical Nursing at the Hadassah – Hebrew University School of Nursing, and in January 2018 he qualified as a Geriatric Nurse Practitioner at the same institution.

### **Relevance of the Dissertation Topic**

The topic of the dissertation, “Effectiveness of Influenza Vaccines in Preventing Morbidity among Adults over 80 Years of Age,” is significant and appropriate for doctoral research. In the context of the rapidly accelerating global population ageing, it is observed that while some people aged 70 enjoy excellent health and functionality, others of the same age are considerably more dependent,

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experiencing significant declines in both physical and cognitive abilities, which leads to more negative consequences both for themselves and for society.

### **Characteristics of the Dissertation**

Pavel Muter presents a scientific study structured according to the generally accepted academic standards for such work in order to obtain the educational and scientific degree Doctor (PhD). The dissertation contains 111 standard typewritten pages and is illustrated with 12 figures and 3 tables. The bibliography includes 154 sources, all written in Latin script.

The dissertation is structured into four parts:

Part One – Ageing and Influenza (32 pages)

Part Two – Aim, Hypotheses and Methods (5 pages)

Part Three – Results (8 pages)

Part Four – Discussion (24 pages)

### **Literature Review**

The literature review of the dissertation topic is presented in the following sections:

#### 1. Ageing;

- Trends in life expectancy in different parts of the world
  - i. The physical and social environment of ageing
  - ii. Ageing in Israel
  - iii. Prevalence of dementia in Israel
  - iv. Alzheimer's disease and dementia among the elderly in Israel
  - v. Care for older adults in Israel
  - vi. Healthcare expenditures for patients with Alzheimer's disease and dementia in Israel

#### 2. Influenza;

- Prevention of influenza among adults aged 65 and older
- Seasonal influenza vaccination in health organizations
- Is immunization effective for the elderly population?
- Two types of influenza vaccines
- Effectiveness of influenza vaccines
- Spatio-temporal mortality among the elderly
- Acute respiratory infection
- Effectiveness of influenza vaccines among elderly people with chronic diseases
- European and global practices in nursing care for oncology patients
  - i. Cardiovascular diseases
  - ii. Patients with diabetes mellitus

### iii. Renal failureСърдечно-съдови

3. The influenza puzzle
4. Conclusions from the literature review

The literature review emphasizes biological ageing, which is associated with a gradual decline in physical capacity and an increased risk of various diseases, including cancer, Alzheimer's disease, diabetes, cardiovascular diseases, and stroke.

The influence of several factors on the age structure of the population is discussed, among which the most important are increased life expectancy, declining birth rates worldwide, and intensive migration — trends also observed in the State of Israel.

The review also highlights that additional years of life allow individuals to engage in new activities such as continuing education, entering a new profession, or seeking employment, as well as contributing to their families and communities.

Health problems affecting older adults in Israel are examined, where the elderly population has access to high-quality healthcare. Between 2000 and 2016, age-specific mortality rates in the country decreased on average by 27% (28% for men and 26% for women). Malignant diseases are the leading cause of death in both sexes, followed by cardiovascular diseases.

At the same time, according to a 2018 report of the Israeli Ministry of Health, the approximate prevalence of dementia among people aged 65 and over in Israel is 6.5%, increasing with age.

The epidemiology of influenza is also reviewed. Influenza outbreaks can lead to up to 500,000 deaths and between three and five million cases of severe illness worldwide, with the majority of influenza-related deaths in industrialized countries occurring among people aged over 65. Due to increasing healthcare costs, influenza has become a serious public health problem. Consequently, influenza vaccination is logically identified as the best preventive measure among the elderly population.

### **Methodology and Organization of the Scientific Study**

The aim of the dissertation is formulated as:

To assess the effectiveness of influenza vaccination among individuals aged 80 years and older with dementia compared with a non-vaccinated group in terms of morbidity, hospitalization rates, and the prevention of suffering for patients and their families.

In accordance with this aim: 6 research tasks were formulated, one of which (economic efficiency of influenza immunization) was not implemented. 2 working hypotheses were formulated regarding disease frequency, hospitalizations and their duration among vaccinated institutionalized elderly patients with severe dementia, and the reasons for refusal of influenza vaccination.

A case-control study was conducted, retrospectively covering 2,396 patients with dementia over a five-year period (2018–2023). Health outcomes were compared between two groups:

Case group – elderly patients with severe dementia who had received influenza vaccination during the last five years

Control group – elderly patients with severe dementia who had not received influenza vaccination during the last five years

The compared groups were diagnosed with socially significant diseases such as diabetes, renal failure, and heart failure. The groups were stratified by sex and age to analyze the effect of the independent variable “influenza vaccination” on the dependent variables morbidity and hospitalizations. The influence of confounding factors — diabetes, renal failure, and heart failure — was controlled.

The study included 2,396 individuals, of whom: 312 were not vaccinated at all, 1,074 were partially vaccinated, 1,010 were fully vaccinated. The average age in each group was 85 years, and women outnumbered men in all groups.

A set of statistical methods was applied for the analysis and interpretation of the data.

## **Results and Discussion**

The results are presented and discussed in the dissertation, including the following findings:

- Only 12.67% of patients with ischemic heart disease and 13.24% of patients with renal failure were not immunized.
- Patients with diabetes, ischemic heart disease, and renal failure have a higher tendency to contract influenza.
- A statistically significant difference between men and women regarding pneumonia incidence was identified ( $p = 0.0007$ ).
- A significant difference was found between patients with renal failure and those without renal failure regarding pneumonia morbidity.
- A significant difference was identified between the three compared groups (vaccinated, partially vaccinated, and non-vaccinated) regarding the number of antibiotic prescriptions.
- A statistically significant difference was also found regarding the number of hospitalizations among the three groups.
- The effects of influenza vaccination reported in the literature were compared with the health outcomes observed in the study. The results of the study do not fully coincide with the literature data:
  - Participants who were not vaccinated at all were diagnosed with pneumonia less frequently (17.95%), whereas fully vaccinated participants were diagnosed with pneumonia most frequently (23.3%).
  - Participants who were not vaccinated had the lowest probability of hospitalization (61.5%).

According to the doctoral candidate, one explanation for the observed differences is the presence of an ultra-Orthodox Jewish community, which undertakes fewer preventive actions and vaccinations against seasonal diseases such as influenza.

## **Conclusions**

The conclusions are presented in a summarized form. The doctoral candidate concludes that: “Despite the contradictory results regarding some clinical indicators, the analysis confirms the importance of influenza vaccination as a safe and potentially beneficial preventive intervention among elderly patients with chronic diseases and dementia.”

## **Contributions of the Dissertation**

### **I. Theoretical Contributions**

1. Scientific knowledge regarding the effectiveness of influenza vaccination among people aged over 80 with dementia has been expanded by integrating epidemiological, clinical, and socio-medical indicators within the public health framework.
2. The need for a comprehensive approach to evaluating vaccination programs among very elderly patients has been substantiated.
3. Scientific understanding has been enriched regarding the influence of immunosenescence, comorbidity, and socio-health factors on the observed effectiveness of preventive interventions among elderly people with dementia.

### **II. Methodological Contributions**

1. A comprehensive analytical model has been applied to evaluate the effect of influenza vaccination by comparing vaccinated, partially vaccinated, and non-vaccinated groups in a real population setting.
2. An approach using indirect indicators of health outcomes (antibiotic treatment frequency, diagnosed pneumonia, and hospitalizations) has been introduced as a tool for evaluating preventive programs in real clinical practice.
3. The applicability of observational population data for analyzing public health interventions among medically and socially vulnerable groups has been demonstrated.

### **III. Scientific-Applied Contributions**

1. Factors influencing vaccination coverage among elderly patients with chronic diseases and dementia have been identified.
2. It has been demonstrated that the interpretation of vaccination program outcomes may be influenced by selection and health-status differences between patient groups.
3. Evidence has been provided supporting the need for an individualized approach to preventive interventions among very elderly patients.

### **IV. Practical Contributions**

1. Recommendations have been proposed for improving the management of preventive programs for older adults through a more active role of healthcare professionals in vaccination decisions.

2. The results may be used to develop strategies for reducing complications, antibiotic use, and preventable hospitalizations among the elderly population.
3. The study provides a scientific basis for improving policies aimed at maintaining functional independence and quality of life in patients with dementia through preventive health interventions.

### **Publications**

Two scientific publications related to the dissertation topic have been presented.

### **Abstract**

The abstract summarizes the dissertation content, describes the methodology, and presents and discusses the most significant results of the study. It consists of 51 pages and is illustrated with figures and tables.

### **Critical Remarks**

1. Although the dissertation addresses a relevant and significant topic — vaccine prevention among the oldest population — the set research tasks are not fully accomplished.
2. Criteria for inclusion and exclusion of cases and controls are not presented, and representativeness of the study groups is not ensured.
3. The most appropriate indicators for comparing risks in a case-control study (Odds Ratio) were not selected or presented to convincingly demonstrate the protective role of influenza vaccination on the health status of the cases. This fact partly explains the discrepancy between the study results and the data reported in the literature.

### **CONCLUSION**

The dissertation thesis presented by Pavel Muter, entitled “Effectiveness of Influenza Vaccines in Preventing Morbidity among Adults over 80 Years of Age,” submitted for the award of the educational and scientific degree Doctor (PhD), addresses a relevant and socially significant topic.

The dissertation contains scientific and applied scientific results that comply with the Law on the Development of the Academic Staff in the Republic of Bulgaria and the Regulations for the Development of the Academic Staff at the Medical University – Varna. It is written in a scientific style and demonstrates the doctoral candidate’s practical skills in the specialty as well as his ability to independently conduct scientific research.

Therefore, I give a positive evaluation of the dissertation and propose that the members of the Scientific Jury support the awarding of the educational and scientific degree “Doctor (PhD)” in the field of higher education 7. Healthcare and Sports, professional field 7.4 Public Health, doctoral program “Public Health Management” to Pavel Muter.

As a reviewer and member of the Scientific Jury, I declare that my vote is positive.

06.03.2026  
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Reviewer:  
/Prof. Mariella Kamburova, MD, PhD/