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## TABLE OF CONTENTS

### Original papers

- YIZCHAK DRESNER, ERICA FRANK, MICHAL SHANI, SHLOMO VINKER  
Physicians' personal health practices and their effect on their patients'  
health practices . . . . . 4
- ANDREI SHPAKOU, ALIAKSANDR SHPAKOU, ALEH KUZNIATSOU  
Population aging is one of the most important challenges facing social  
policy and public health . . . . . 8
- LINA GEDRIMĖ, NATALJA ISTOMINA-FATKULINA, INDRE BRASAITE,  
SANNA SALANTERÄ  
Information needs of digestive tract surgery patients before  
and after surgery: an exploratory study of western Lithuania . . . . . 14
- PAWEL SALWA, WOJCIECH KIELAN  
Peri- and post-operative results of initial robot-assisted radical  
prostatectomies of a surgeon graduating from a structured fellowship . . . 17

### Reviews

- CHRISTOS LIONIS, MARILENA ANASTASAKI  
Integrated health care services as a current challenge for primary health  
care: reflections from Crete, Greece . . . . . 22
- MICHAL YESHAYAHU, KAREN SHECHTER, TANYA JACUBOVSKY,  
ERELA ROTLEVI  
Can community and hospital medicine meet? A novel integrative care  
experience at Assuta University Medical Center . . . . . 26
- WILLIAM E. HILLS  
Behavioral health and new models of service delivery for an aging world:  
Public/private partnerships to develop best practices of care  
for older adults . . . . . 29
- VALERIY KOVALEVSKIY, LIUDMILA G. KLIMATCKAIA,  
YULIJA YU. BOCHAROVA  
The role of The University Center for Social Development in the regional  
innovation ecosystem of social assistance . . . . . 34
- AELITA SKARBALIENĖ  
Emotional intelligence in healthcare . . . . . 40
- GERGANA AVRAMOVA-TODOROVA, MILEN TODOROV  
Digital technologies for art therapy practices used in healthcare . . . . . 43
- PIOTR RAJFUR  
Selected models and the classification of health care systems . . . . . 48

### Opinion paper

- GRETCHEN EDWALDS-GILBERT  
Building bridges between basic science and clinical medicine:  
a liberal arts perspective . . . . . 55
- MARK JEREMY HUNT, MAGDALENA OCHMAŃSKA,  
JUSTYNA CILULKO-DOŁĘGA  
How to write an effective response letter to reviewers . . . . . 60
- The instruction for the authors submitting papers  
to the quarterly Medical Science Pulse . . . . . 64



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**LADIES AND GENTLEMEN, FACULTY,  
GRADUATES AND STUDENTS OF  
UNIVERSITIES, READERS AND ENTHUSIASTS  
OF MEDICAL SCIENCE PULSE!**

We are pleased to inform you that *Medical Science Pulse* quarterly has entered 2019 with a new version of quality – as an exclusively electronic journal e-ISSN 2544-1620, which of course is still available in the Open Access system under Creative Commons licenses, i.e. in the greatest possible form of popularisation at your disposal.

Our continued editorial improvements, submissions of original scientific manuscripts, increasing number of authors from Polish and international scientific centres, stable number of reviewers, professional editors and support of a wide group of members of the Scientific Council, and outstanding international researchers, have contributed to success at the *MSP* editorial office and a positive recommendation from experts in the “Support for Scientific Journals” competition. The quarterly has been added to the list of scientific journals of the Ministry of Science and Higher Education with a score of 20 points since 2019! *Medical Science Pulse* is the only scientific journal in the field of medical sciences and health sciences on this list in the Opolskie Voivodeship.

The beneficiaries of the competition will receive financial support to popularize journals in an international scientific environment by further improving the level of publishing and editorial practices. Of course, this requires an ever-increasing effort on the part of the editorial staff to effectively manage the scientific and publishing policy of the quarterly.

Issue 1 is traditionally published during the 6th International Medical Science Pulse Conference, Opole 23-24 May 2019. The main topics of the conference include commercialization of research and develop-

ment initiatives and innovativeness of projects in the broadly understood area of healthcare, including aspects of conducting research and its popularisation in the economic environment, legal issues and other matters related to intellectual property. This year’s conference closes a six-year cycle of excellent scientific meetings, which have been hosted by hundreds of participants, presenting topics from scientific publication, through grants and scientific projects, through the aspects of interdisciplinarity in science and research teams to the integration of science and health care in the context of innovation and commercialization. All the conferences were organized by the editorial team of the *Medical Science Pulse* quarterly, formerly *Puls Uczelni*, under the patronage of the Rector of Opole Medical School. The aim of this conference was and still is to promote scientific development, especially of young scientists and students, as well as to create a forum for scientific discussion and presentation of research and achievements of scientists in the international and national environment, popularisation of science, with particular emphasis on medical sciences and related sciences, and to identify various groups of professionals associated with the establishment and promotion of science in the social and economic environment. This year, once again, we received additional funding for the organization of the conference with the funds from the budget of the Opolskie Voivodeship within the framework of small grants for universities in the region.

In issue 1/19 we pay special attention to the original articles that address current issues regarding: *Physicians’ personal health practices and their effect on their patients’ health practices*, *The problem of aging of the pop-*

ulation as one of the most important challenges for social policy and public health, Information needs of digestive tract surgery patients before and after surgery and Peri- and post-operative results of initial robot-assisted radical prostatectomies of a surgeon graduating from a structured fellowship. In the section devoted to review articles, we publish papers on: *Integrated health care services as a current challenge for primary health care: reflections from Crete, Can community and hospital medicine meet? A novel integrative care experience at Assuta University Medical Center in Israel, Behavioral health and new models of service delivery for an aging world: public/private partnerships to develop best practices of care for older adults, The role of the University Center for Social Development in the regional innovation ecosystem of social assistance, Emotional intelligence in healthcare, Digital technologies for art therapy practices used in healthcare and Selected models and the classification of health care systems.* In the Opinion section papers we present a very interesting work on: *Building bridges between basic science and clinical medicine: a liberal arts perspective* and language tips *How to write an effective response letter to reviewers.*

We continuously encourage our readers, students, graduates, young scientists and researchers from universities and other institutions to publish their scientific papers in English in *Medical Science Pulse*. It is an excellent way to build one's academic achievements, even for beginners, in the form of preparing e.g. theses with the use of high-quality diploma dissertations and a chance to be quoted by others. We guarantee a high editorial level of publications, a standardized review process and compliance with the rules of ethics, we offer workshop support in the preparation of the article and the English editorial proofreading of a native speaker, a medical sciences specialist. We do not charge authors any fees and the works are published in Open Access under Creative Commons licenses, which allows your texts to reach a wide audience around the world. Detailed information can be found at: <https://medicalsciencepulse.com/resources/html/cms/MAINPAGE>.

The next step in the development of the quarterly is January 2020 – the journal evaluation is scheduled to begin in January 2020 in Web of Science bases. And we hope for continued success!



# PHYSICIANS' PERSONAL HEALTH PRACTICES AND THEIR EFFECT ON THEIR PATIENTS' HEALTH PRACTICES

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**A** – study design, **B** – data collection, **C** – statistical analysis, **D** – interpretation of data, **E** – manuscript preparation, **F** – literature review, **G** – sourcing of funding

## ABSTRACT

**Background:** Although much has been written about the potential power of the association between physicians' personal health practices and those of their patients, we found few objective studies of this relationship. We therefore investigated this association using objectively measured health care indicators.

**Aim of the study:** The aim of the study was to show the association between physicians' own screening/immunization practices and their patients screening/immunization practices.

**Material and methods:** We assessed 8 indicators of quality of health care (screening and vaccination practices) for primary care physicians (n=1488) and their adult patients (n = 1 886 791) in Israel's largest health maintenance organization. The physicians were also patients in this health care system

**Results:** For all 8 indicators, patients whose physicians were compliant with the preventive practices were more likely ( $p < 0.05$ ) to also have undergone these preventive measures than patients with noncompliant physicians. We also found that more similar preventive practices showed somewhat stronger relations. For example, among patients whose physician had received the influenza vaccine, 49.1% of eligible patients received influenza vaccines compared to 43.2% of patients whose physicians did not receive the vaccine (5.9% absolute difference, 13.7% relative difference). This is twice the relative difference (7.2%) shown for pneumococcal vaccine—eligible patients of influenza-vaccinated versus non vaccinated physicians (60.9 vs 56.8%). When we examined the rates of un-related practices, we found that, for example, mammography rates were identical for patients whose physicians did and did not receive the influenza vaccine

**Conclusions:** We found a consistent, positive relation between physicians' and patients' preventive health practices. Objectively establishing this healthy doctor—healthy patient relationship should encourage prevention-oriented health care systems to better support and evaluate the effects on patients of improving the physical health of medical students and physicians.

**KEYWORDS:** physicians, patients, personal health practices, health care indicators

## BACKGROUND

Physicians in industrialized countries live longer than do the general population in those countries (even when compared with others of high socioeconomic status (SES) [1–3]. Their self-reported health related habits have also been found to be considerably better than that of others (including those of high SES) [3].

Doctors' health matters, both because a healthy physician workforce is more productive, and because

physicians' health practices affect their patient counseling habits.

In addition, we hypothesized that physicians' objectively-measured personal preventive practices are directly correlated with their patients' objectively-measured related preventive experiences. It has been established (at least in Canada, Colombia, and the U.S.) that physicians and medical students who report healthier personal habits are also consistently and significantly

more likely to also report more frequent patient counseling on related habits [4–9]. However, this healthy doctor - healthy patient link has only been studied via physicians' and patients' self-reported counselling and preventive practices, not through objectively-measured clinical prevention practices, documented with electronic medical records.

## AIM OF THE STUDY

The aim of the study was to show the association between physicians' own screening/immunization practices and their patients screening/immunization practices.

## MATERIAL AND METHODS

In 2011, we electronically accessed all eight preventive quality health indicators (screening and immunization practices) in Israel's largest health maintenance organization from primary care physicians (PCPs,  $n=1,488$ ) who were also system patients, and from their adult patients ( $n=1,886,791$ ) to determine if the healthy doctor-healthy patient relationship that we hypothesized was true

We analyzed a comprehensive central database where all Clalit Health Services (CHS) patients' computerized demographic, risk factor, disease registry, pharmacy, quality indicator and other clinical and

administrative data are stored. Data were identified through patients' identification numbers and the primary care physician to whom they were allocated. For each PCP, we determined the total number of patients, the percentage of men, the percentage of patients >65 years of age, and the percentage of low socioeconomic status patients. We examined CHS physicians' own prevention habits and those of their adult patients among PCPs who had worked for at least a year in the same practice in CHS, who are also insured by CHS, and who had a patient panel of  $\geq 500$  patients. For each indicator tested, we included PCPs with at least 5 patients eligible for the specific indicator, providing a cross-sectional measure of concordance between physicians' personal and clinical prevention habits, as evidenced by their patients' clinical experiences. This study was approved by the CHS Ethics Committee.

## RESULTS

Tab. 1 shows the association between physicians' own screening/immunization practices and those of their patients ( $n=1,886,791$ ). In every case, our primary hypothesis was confirmed. Patients with prevention-compliant PCPs were significantly more likely to also have those prevention practices than were patients with non-compliant physicians. ( $p<0.05$ ) Often this difference was also clinically significant, showing as much as a 13.7% relative (though lower absolute) difference

Table 1. Proportion of 1 886 791 patients who received a preventive intervention, according to whether their physician received or did not receive a corresponding preventive intervention

Receipt of intervention by eligible physicians	Mean % of eligible patients who received intervention							
	Mammogram	Colorectal cancer screening	LDL measurement	Blood pressure measurement			Pneumococcal vaccine	Influenza vaccine
				Every 5 yr if age 20–40 yr	Every 2 yr if age 41–54 yr	Every year if age $\geq 55$ yr		
<b>Mammogram</b>								
Yes ( $n = 231, 67.0\%$ )	69.5	49.2	83.3	84.3	81.5	77.8	57.3	44.5
No ( $n = 114, 33.0\%$ )	66.7	45.4	82.2	82.9	79.7	76.5	52.9	40.6
$p$ value*	0.002†	< 0.001‡	0.1	0.2	0.1	0.2	0.002‡	0.003‡
<b>Colorectal cancer screening</b>								
Yes ( $n = 502, 60.9\%$ )	68.4	50.0	83.2	82.8	81.7	78.4	59.8	47.6
No ( $n = 322, 39.1\%$ )	66.1	45.6	81.3	82.3	81.2	77.0	58.1	45.0
$p$ value*	< 0.001‡	< 0.001†	< 0.001‡	0.5	0.5	0.06	0.08	0.007‡
<b>LDL measurement</b>								
Yes ( $n = 602, 88.7\%$ )	67.8	48.1	83.1	82.7	81.4	77.3	59.0	46.3
No ( $n = 77, 11.3\%$ )	64.9	47.4	81.2	83.4	81.6	77.0	59.3	47.0
$p$ value*	0.01‡	0.6	0.02†	0.6	0.8	0.8	0.8	0.9
<b>Blood pressure measurement every 5 yr if age 20–40 yr</b>								
Yes ( $n = 118, 60.5\%$ )	66.2	47.1	82.2	83.7	82.2	78.3	59.6	45.4
No ( $n = 51, 39.5\%$ )	67.5	48.8	83.5	80.9	79.6	73.2	58.0	46.1
$p$ value*	0.4	0.2	0.2	0.04†	0.1	0.004‡	0.4	0.8
<b>Blood pressure measurement every 2 yr if age 41–54 yr</b>								
Yes ( $n = 371, 73.2\%$ )	67.1	47.7	82.9	83.5	82.6	78.4	59.0	46.4
No ( $n = 136, 26.8\%$ )	68.6	48.9	82.8	82.7	80.7	76.5	58.8	47.0
$p$ value*	0.07	0.2	0.8	0.4	0.04†	0.03†	0.8	0.7
<b>Blood pressure measurement every year if age <math>\geq 55</math> yr</b>								
Yes ( $n = 194, 66.2\%$ )	67.1	47.3	82.1	83.5	81.9	78.3	59.6	44.6
No ( $n = 99, 33.8\%$ )	67.1	46.3	82.0	78.5	76.8	73.8	57.7	45.7
$p$ value*	0.9	0.4	0.8	0.003‡	< 0.001‡	< 0.001†	0.2	0.5
<b>Pneumococcal vaccine</b>								
Yes ( $n = 101, 44.5\%$ )	66.5	48.8	81.6	83.7	84.3	80.4	62.1	49.0
No ( $n = 126, 55.5\%$ )	66.5	47.1	80.7	81.4	80.3	76.4	56.6	45.1
$p$ value*	0.9	0.2	0.4	0.2	0.01‡	0.005‡	0.004†	0.03‡
<b>Influenza vaccine</b>								
Yes ( $n = 735, 51.2\%$ )	67.2	48.2	82.8	82.9	82.0	78.0	60.9	49.1
No ( $n = 701, 48.8\%$ )	67.1	46.1	81.9	82.8	81.0	77.0	56.8	43.2
$p$ value*	0.8	< 0.001‡	0.01‡	0.9	0.07	0.04‡	< 0.001‡	< 0.001†

Note: LDL = low-density lipoprotein.  
 \*Calculated using the  $\chi^2$  test.  
 † $p$  value for comparison of identical patient and doctor preventive interventions (e.g., % of eligible patients having a mammogram v. % of their physicians who had a mammogram), indicating a patient's likelihood of receiving the intervention depending on whether or not the patient's doctor had received the same intervention.  
 ‡ $p < 0.05$  for comparison of nonidentical patient and doctor preventive interventions (e.g., % of eligible patients having a mammogram v. % of their doctors who underwent colorectal cancer screening), indicating the likelihood of a patient receiving the intervention depending on whether or not the patient's doctor had received the comparison intervention.

between patients with compliant and non-compliant PCPs. As also shown in the table, we found that, while some recorded physician preventive habits were better than those of patients (influenza vaccine, LDL measurement, and CRC screening), some were worse (Pneumovax and BP measured by their PCP's office), and one was similar (mammography).

## CONCLUSIONS

These data indicate that making it easier for physicians to personally obtain preventive care increases the likelihood that their patients would also obtain such care. We believe that physician health promotion programs should be developed and studied to determine how best to actively-encourage this association. We know of only one large intervention study [10,11] to promote healthy physical habits among medical students, and of none promoting healthy physical habits among physicians. The former study [10,11] demonstrated that intervening to improve medical students' dietary and exercise practices improved their likelihood of them counselling patients on diet and exercise. Our study of electronic medical record data, compared to

self-report used in previous studies suggests that there is room for improvement in some physicians' personal prevention practices, particularly around screening and immunization, and that improving the health of this relatively small cohort of physicians could improve health outcomes of a large cohort of patients.

Objectively establishing this "Healthy Doctor = Healthy Patient" relationship should spur researchers to test various ways to promote physician health in order to promote patient health, medical schools to try to produce more avid preventionists, [12] and health-care systems to support physician health. Physician health is rarely systematically promoted anywhere in the world, suggesting that policy-makers believe physicians to already be adequately-supported. And in the few places that there are programs, they concentrate heavily on suitability and competence to practice, on mental health and illness, and on practice-related psychological motivation and physical stamina. But our profession should do more than that, and we can now do so on the most pragmatic grounds: we should try (and study) improving physicians' preventive practices, as these data suggest that patients' health could substantially benefit if we do so.

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# POPULATION AGING IS ONE OF THE MOST IMPORTANT CHALLENGES FACING SOCIAL POLICY AND PUBLIC HEALTH

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A – study design, B – data collection, C – statistical analysis, D – interpretation of data, E – manuscript preparation, F – literature review, G – sourcing of funding

## ABSTRACT

**Background:** Population aging is one of the most important social policy and public health challenges for the state. Increased proportions of older people is accompanied with increased negative attitudes manifested toward them, as represented by ageism, the discrimination against the elderly, contributing to their exclusion from public life.

**Aim of the study:** To study the prevalence and characteristics of ageism manifestations in healthcare institutions in the city of Grodno (Belarus) and to consider measures to minimize it.

**Material and methods:** 250 random urban respondents from Grodno age 60 or more not undergoing treated in healthcare institutions were anonymously questioned. Data analysis was performed using different statistical methods.

**Results:** The majority of respondents rated geriatric, social and medical care in the country as functioning at a high level. The share of elderly people who felt age discrimination was 70 (28.0%) and was independent from the gender and age of the respondents. Clinical departments were mentioned by 24 (34.3%) of respondents as places where manifestations of ageism were seen, particularly in emergency rooms – 14 (20.0%) and family doctor offices – 17 (24.3%). In 35 (50%) of cases, the family doctor explained the symptoms of the disease by the onset of old age, which can be regarded as a manifestation of ageism.

**Conclusions:** Training in the field of geriatrics is very important for medical professionals. Failure to take measures to ensure a holistic (integrated) approach in the treatment and care of elderly must be considered discriminatory. Particular measures should be taken to develop all types of care for the elderly, increasing the level of patient satisfaction with medical services and reducing the frequency of gerontological ageism manifestations.

**KEYWORDS:** healthcare sector, discrimination, ageism

## BACKGROUND

The aging of the population is one of the most important problems for social and public policies of the state [1,2]. Some of the key problems older people encounter globally include discrimination, low living standards compared to populations, and chronic diseases. On the basis of the principles of the United Nations (UN, General Assembly resolution 46/91, December 16, 1991), all governments are recommended to “make the life of the elderly full-fledged”. In this regard, it is necessary to take measures in the field of social support for the elderly, ensure independence, participation in society,

provision of care and protection by family and society, and promote the realization of their internal potential. Furthermore, a national policy on the elderly is recommended to strengthen communication between generations, protect the elderly from economic shocks, ensure the quality of life in institutions for the elderly, and provide the elderly with social services regardless of their place of residence [3].

The size of the world’s elderly population is steadily growing, including in Belarus [4–7]. The population of Belarus, like most countries of the world, continues to age. Over the past 10 years, life expectancy at birth

has increased among Belarusian citizens and amounted to 74.4 years in 2017 (women – 79.2 years, men – 69.3 years) [8]. Older people accounted for 1.9 million (1.2 million of whom are women) of the total population (9.5 million) at the beginning of 2019. Every fifth resident has reached retirement age. The ratio between women and men is 1.8:1 [9]. The share of people aged 60 and over in the country is expected to surpass 25% by 2035.

Positive trends in the elderly include the following: every year among older people in Belarus, the number of people engaged in physical culture and recreational motor activity increases (15.3% at the beginning of 2010, 21.2% in 2017), the age of 60+ is not a hindrance for family creation [10]. In 2018, 1002 women and 1546 men have married at this age category (in 774 cases, both married over 60). The number of users of Internet services among elderly residents is 23.7% (2016). 27.7% of urban and 13.8% of rural residents are currently able to use the Internet. Every day, 41.9% of elderly users use the Internet: (urban residents – 42.5%, rural residents – 39.2%).

The growing elderly population is increasingly perceived as a problem phenomenon. This manifests itself as a negative attitude towards older people, provoking a fear of aging. The cult of young age contributes to the elimination of older people from social life and other manifestations of gerontological ageism – discrimination of someone by age, neglect or degrading practices based on negative age stereotyping [11]. This phenomenon is just as prevalent as racial and gender discrimination, revealing itself primarily in the areas of health and social services [12–14]. Among older people subjected to discrimination or witnesses of discrimination, social tension increases, further exacerbating the problem [15,16].

## AIM OF THE STUDY

To study the prevalence and characteristics of ageism in healthcare institutions in the city of Grodno (Belarus) and consider measures for its minimization.

## MATERIAL AND METHODS

250 random urban respondents from Grodno aged at least 60 not currently being treated at healthcare institutions were anonymously questioned.

The study was performed in 2017–2018. The Dpe-ciak questionnaire were used to study the phenomenon of age-based age discrimination [17]. The questionnaire was translated into Russian and adapted to this study and the contingent. The main questions of this questionnaire on which the study was based concerned cases and features of a dismissive or degrading attitude towards the respondent and peers in society, and in particular, at healthcare institutions.

Statistical data processing was performed using Statistica software package. The description of qualitative

features was carried out by calculating the absolute values and relative (%) frequencies with 95% confidence intervals (95% CI). The  $\chi^2$  test was used to compare the relative frequencies of qualitative traits in the different age groups. Differences were statistically significant if  $p < 0.05$ .

## RESULTS

The socio-demographic characteristics of the surveyed respondents (gender, age, marital status, family structure, place of residence, living conditions, financial component, education) are presented in Table 1.

Table 1. Socio-demographic characteristics of the respondents (n=250)

Key demographic indicators		Respondents, absolute amount (%)
Sex	male	82 (32,8)
	female	168 (67,2)
Age, years old	60–70	102 (40,8)
	71–80	111 (44,4)
	older 80	37 (14,8)
Family status	married	79 (31,6)
	widower/widow	115 (46,0)
	single, not married	23 (9,2)
	divorced, live separately	33 (13,2)
Location	big city (more than 200 thousand inhabitants)	170 (68,0)
	middle size city (50–200 thousand inhabitants)	25 (10,0)
	small size city (up to 50 thousand inhabitants)	15 (6,0)
	village	40 (16,0)
Financial status	very good	5 (2,0)
	good	54 (21,6)
	middle	152 (60,8)
	bad	31 (12,4)
	very bad	8 (3,2)
Education	higher education	63 (25,2)
	secondary education	50 (20,0)
	specialized secondary	97 (38,8)
	incomplete secondary	40 (16,0)
Family structure	one generation	135 (54,0)
	two generations	64 (25,6)
	three generations and more	51 (20,4)

The level of geriatric care organization in the country by respondents' answers is presented in Figure 1. Most respondents rated the country's level of geriatric care organization as good.

Differences in evaluation between respondents by age are statistically significant. For example, the group of respondents aged 60–70 assessed the system of rendering geriatric care as insufficient.

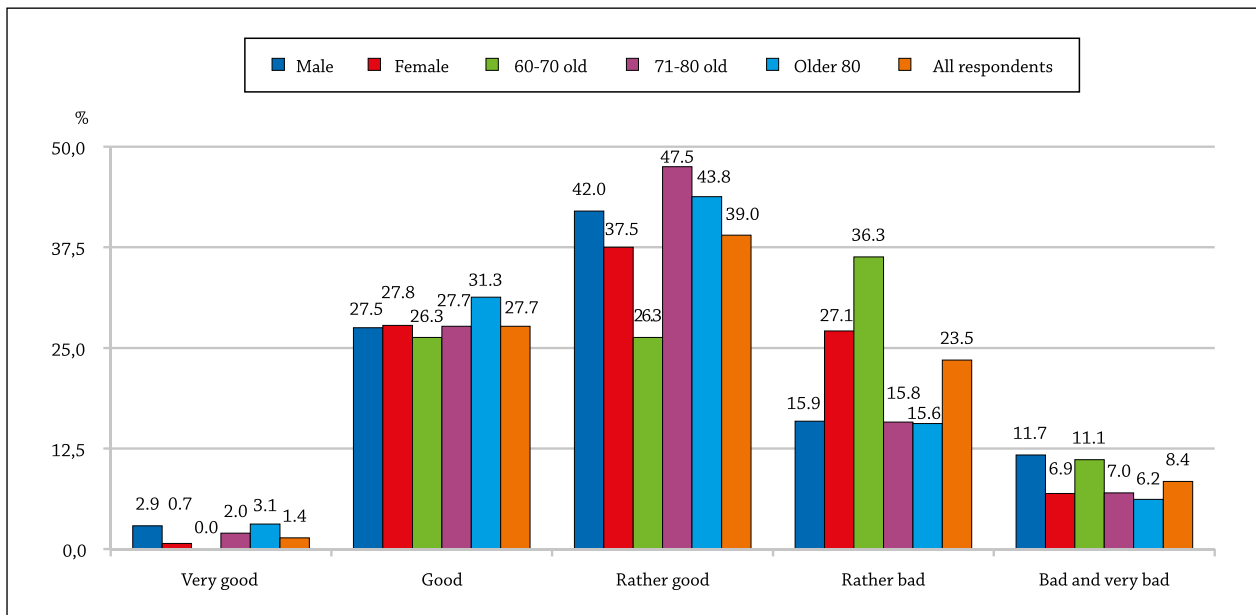


Figure 1. Evaluation of the system of geriatric care, depending on gender and age (subjective).

The features in the evaluation of medical care and nursing care for the elderly were established: among the respondents' answers about the level of medical care and the organization of nurs-

ing care were dominated by the answers "good" and "rather good". Based on the analysis of respondents' answers, the Quality of Health Care Index is high (Table 2).

Table 2. Evaluation of the organization and implementation of medical care (1) and nursing care (2) for the elderly, separated by gender and age (%). Frequency with 95% confidence intervals (95% CI).

Mark	Sex				Age						Total	
	Male (n=82)		Female (n=168)		60-70 years old (n=102)		71-80 years old (n=111)		over 80 years old (n=37)			
	1	2	1	2	1	2	1	2	1	2	1	2
Very good	1 (1.2%) (1.16-3.6)	1 (1.2%) (1.16-3.6)	1 (0.6%) (0.7-1.8)	1 (0.6%) (0.7-1.8)	0	0	1 (0.9%) (-0.9-2.7)	1 (0.9%) (-0.9-2.7)	1 (2.7%) (-2.5-7.9)	1 (2.7%) (-2.5-7.9)	2 (0.8%) (-0.3-1.9)	2 (0.8%) (-0.3-1.9)
Good	18 (22.0%) (13.0-30.9)	18 (22.0%) (13.0-30.9)	46 (27.4%) (20.6-34.1)	56 (33.3%) (26.2-40.5)	22 (21.6%) (13.6-30.0)	18 (17.7%) (10.3-25.1)	27 (24.3%) (16.3-32.3)	40 (36.0%) (27.1-45.0)	15 (40.5%) (24.7-56.4)	16 (43.2%) (27.3-59.2)	64 (25.6%) (20.2-31.0)	74 (29.6%) (23.9-35.3)
Rather good	34 (41.5%) (30.8-52.1)	32 (39.0%) (28.5-50.0)	59 (35.1%) (27.9-42.3)	57 (33.9%) (26.8-41.1)	24 (23.5%) (15.3-31.8)	31 (30.4%) (21.5-39.3)	55 (49.6%) (40.3-58.9)	46 (41.4%) (32.3-50.6)	14 (37.9%) (22.2-53.5)	12 (32.5%) (17.4-47.5)	93 (37.2%) (31.2-43.2)	89 (35.6%) (29.7-41.5)
Rather bad	15 (18.3%) (9.9-26.7)	16 (19.5%) (10.9-28.1)	35 (20.8%) (14.7-27.0)	28 (16.7%) (11.0-22.3)	31 (30.4%) (21.5-39.3)	26 (25.5%) (17.0-34.0)	15 (13.5%) (7.2-19.9)	14 (12.6%) (6.4-18.8)	4 (10.8%) (0.8-20.8)	4 (10.8%) (0.8-20.8)	50 (20.0%) (15.0-25.0)	44 (17.6%) (12.9-22.3)
Bad and very bad	4 (4.9%) (0.2-9.54)	4 (4.9%) (0.2-9.54)	9 (5.4%) (1.9-8.8)	8 (4.8%) (1.5-8.0)	4 (3.9%) (0.2-7.7)	6 (5.9%) (1.3-10.5)	7 (6.3%) (1.8-10.8)	4 (3.6%) (0.1-7.1)	2 (5.4%) (-1.9-12.7)	2 (5.4%) (-1.9-12.7)	13 (5.2%) (2.5-8.0)	12 (4.8%) (2.2-7.5)
No answer	10 (12.1%) (5.12-16.3)	11 (13.4%) (6.0-20.8)	18 (10.7%) (6.0-15.4)	18 (10.7%) (6.0-15.4)	21 (20.5%) (12.7-28.4)	21 (20.5%) (12.7-28.4)	6 (5.5%) (1.2-9.6)	6 (5.5%) (1.2-9.6)	1 (2.7%) (-2.5-7.9)	2 (5.4%) (-1.9-12.7)	28 (11.2%) (7.3-15.1)	29 (11.6%) (7.6-15.6)
Quality index <sup>1</sup>	47.2	43.7	40.7	52.7	13.6	21.0	58.1	65.7	66.7	65.7	41.4	49.3
Total answers	82		168		102		111		37		250	

<sup>1</sup>The quality of care index = ("very good" + "good" + "rather good") - ("very bad" and "bad" + "rather bad") \* 100 / sum of answers.

The quality of care index did not show differences between genders. Older respondents rated the level of medical care and organization of nursing care better than those under the age of 70 years. Respondents rated the organization of nursing care higher than the organization of medical care (women).

70 (28.0%) of the respondents faced age discrimination, but it did not depend on the gender and age of

the respondent. About 30% (75 respondents) indicated that they had witnessed ageism.

Respondents specified manifestations of ageism, and described people and places where it was manifested.

Older persons were more critical of the system's provision of geriatric, nursing and social care, as well as the system of medical care for the elderly in general (Figure 2).

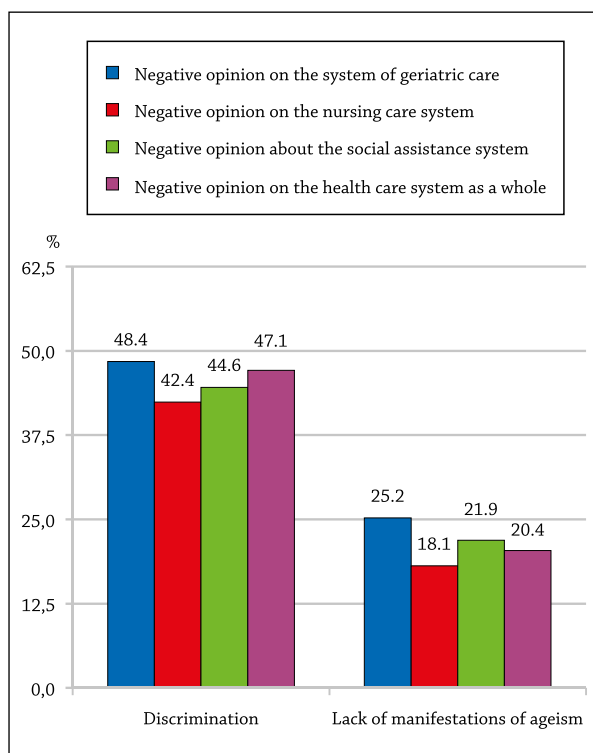


Figure 2. Views on providing assistance to older people and manifestations of ageism among the respondents interviewed

The genders and ages of the respondents did not significantly affect the answers regarding health workers expressing elements of age discrimination: in 19 (27.1%) of cases, such as manifestations associated with the activities of a doctor. Women more often noted improper treatment by the doctor. Nurses and registry staff showed elements of ageism to the patient less often than doctors (20; 28.6%). Men were unsatisfied by the work of registry staff more often. About 20% noted manifestations of age discrimination by younger patients. 24 (34.3%) of respondents indicated clinical departments as a place where elements of ageism were more expressed. 14 (20.0%) mentioned that the medical staff in the emergency room of the clinic and 17 (24.3%) stated that the local doctor's office demonstrated ageism. 35 (50%) stated that the family doctor discussed disease as a symptom of old age, which the majority of respondents considered as a manifestation of a discriminatory attitude towards elderly patients.

Analyzing the underlying causes of ageism in healthcare institutions, it was found that 24 (34.3%) respondents pointed to the scornful attitudes of medical workers. 16 (22.9%) indicated the reluctance of a nurse or doctor to provide objective information about their disease.

Among the surveyed respondents, 144 (57.6%) believed that the phenomenon of discrimination against older people in the healthcare sector is a social problem. 165 (66.0% of respondents) noted incorrect attitudes towards them due to their age. 89 (35.6%) said lack of healthcare funding was the biggest threat to geriatric care: the prerequisites for discriminatory practices in health care are the low social status of professions

focused on providing health care and services to older people, not always the high quality of their training and a lack of staff.

74 (29.6%) respondents pointed to the low interest of physicians (doctor, nurse) in specializing in geriatrics, and, as a result, 65 (26.0%) stated that there was a lack of specialists in specialized departments of clinics, and 96 (38.4%) stated that widespread prerequisites of gerontological ageism and threats to the functioning of the geriatric care system were present. Every tenth respondent pointed to the stigmatization of geriatrics by specialists from other medical specialties.

## DISCUSSION

In the modern literature, the number of publications on the status and evaluation of geriatric care for elderly patients is increasing, indicating the relevance of research in this area [18–19].

Explanation by medical workers of disease symptoms as caused by aging is often the result of insufficient coverage of geriatric problems during medical specialist training. Our study showed that in half of cases the doctor explained the presence of specific symptoms of the disease by the patient's advanced age. In a study by Jędrzejkiwicz *et al* [20] reported a similar result. Other results were obtained by S. Kropinska [17], according to whom, 22% of elderly people indicated that the doctor explained the presence of symptoms of the disease as caused by old age. McGuire *et al* [21] presented results when 40.0% of the elderly claimed that the medical staff attributed the onset of symptoms to the attainment of old age.

Our data confirm that in more than 30% of cases, medical personnel do not wish to explain mechanisms of disease development, and expectations for obtaining qualified information remain unfulfilled. T. Saleem *et al* [22] found in a group of 380 patients aged 65+ that the most common frustration of older people was precisely the reluctance of the medical staff to provide detailed information on the mechanisms of disease development in a form accessible to the patient (60.0%).

A study conducted by Grzanka-Tykwińska *et al* [23] showed that 16% of respondents aged 60+ reported they were victims of other forms of discrimination because of their age. In our study, the percentage of elderly people who regard the actions of medical personnel as discriminatory amounted to almost one third of all respondents.

The majority of respondents indicate that discriminatory attitudes towards the elderly are characteristic of the doctor (75.0%) [17], with the behavior of the nurse (more than 23.0%) in second place by a large margin. Respondents usually name the hospital department (44.2%) as a place of discrimination. Study of the answers of respondents in our study showed that the most frequent "discriminators" were also a doctor and less often a nurse (doctor – 20 – 28.6%, nurse – 18 – 25.5%).

In one study [24], almost 20.0% of elderly respondents noted that they had repeatedly witnessed discrimination due to age against their peers in healthcare institutions. Our study confirmed this trend. About 30% of respondents noted that they had witnessed ageism in the behavior of health workers in relation to other elderly people. The frequency of manifestations of discrimination against other older people is almost identical to the frequency of occurrence of elements of discrimination against themselves, which may indicate a willingness to publicly acknowledge the existence of a discriminatory attitude, and thus exacerbate this problem in society.

These results are new, because in earlier studies, the elderly only reluctantly admitted that they were discriminated against and only 13% of respondents reported manifestations of ageism, with many preferring to hide it [25].

A small number of scientific studies on the evaluation of geriatric care has led to a lack of proposals and solutions aimed at addressing these issues in countries with relatively low rates of care for the elderly.

Our study showed that low levels of geriatric funding, a lack of geriatric specialists (doctors, nurses)

and an insufficient number of specialized departments to assist the elderly are central to the existence and development of the geriatric care system in the country.

## CONCLUSIONS

Failure to take measures to ensure a holistic (integrated) approach in the treatment and care of older people must be considered a manifestation of discrimination and is more common than cases of ageism.

The phenomenon of discrimination on the basis of age in the health system is a problem for geriatrics and gerontology, therefore, when training future doctors and nurses, it is imperative to instill in staff the desire for advanced training in this area, development of empathy and the desire to understand the patient, the ability to communicate information about health and disease mechanisms.

It is necessary to envisage measures to develop the system of medical care for the elderly, increase the level of patient satisfaction with medical services and reduce the frequency of manifestations of gerontological ageism.

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# INFORMATION NEEDS OF DIGESTIVE TRACT SURGERY PATIENTS BEFORE AND AFTER SURGERY: AN EXPLORATORY STUDY OF WESTERN LITHUANIA

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**A** – study design, **B** – data collection, **C** – statistical analysis, **D** – interpretation of data, **E** – manuscript preparation, **F** – literature review, **G** – sourcing of funding

## ABSTRACT

**Background:** Information has a distinct value for operative care from the perspective of both the patient and the professional.

**Aim of the study:** The aim of this study was to describe the information needs of patients undergoing gastrointestinal surgery in western Lithuania.

**Material and methods:** The data was collected from patients at three Klaipeda city hospitals performing digestive tract surgeries from January through March 2015. The interview responses (n = 86) were analyzed inductively with thematic content analysis.

**Results:** The interviews revealed a lack of information about disease, treatment and nursing care. The participants expressed fear and worries about their forthcoming surgery, anesthesia, pain, methods of pain management, possible complications and their prevention as well as their prognosis.

**Conclusions:** The results show that the participants lacked information about treatment, nursing, anesthesia, rehabilitation, wound care or about post-surgery period. Instead they felt fear and anxiety. The participants were excluded from treatment and nursing processes. According to the participants, their information needs were different before and after the surgery. Lack of information prevents patients from acting self-dependently in their care.

**KEYWORDS:** information needs, digestive tract surgery, patients' education

## BACKGROUND

Information has a distinct value to operative care from the perspective of both the patient and the professional. Communication between professionals and patients has been changing and the trend is to give increasing responsibility to the patient [1]. Understanding information about their disease and treatment helps the patient make treatment decisions, supplement information or advice provided by a health professional, manage their own health or health conditions, troubleshoot symptoms, provide a second opinion, modify health and lifestyle behaviors, enhance interactions with their healthcare providers, decide if a visit to the doctor is necessary, choose a healthcare provider, prepare for con-

sultation, clarify or validate information received from another source, increase knowledge of their disease or medical condition, identify the underlying causes of a condition, seek alternative treatment options, take charge of one's life, and seek emotional support [2].

For patients it is crucial both before and after an operation to have the relevant information, so that they can act in their own care and feel empowered [3]. Individuals with different diseases seek information about their specific situation, illness, treatment plan, alternative treatment, and prognosis [2]. Information provided to patients is important for their empowerment and enablement because it helps create a supportive environment, develop personal skills [4] and

strengthen patients' sense of control and self-efficacy [5]. It is important to notice that patient needs are specific to their individual clinical situation and patients with different diseases have different desires for information about their disease and their treatment which may influence the way they manage their long-term disease [2]. The aim of this study was to identify the informational needs of patients undergoing digestive tract surgery in Western Lithuania.

## METHODS

The data was collected from patients at 3 hospitals of Klaipeda city in the period January-March 2015. The inclusion criteria for the participants were as follows: age 18 or above, before or after digestive tract surgery, ability to understand, speak, read and write in Lithuanian or English. 86 patients participated in the interview during their hospitalization. The topic list (formed in the pilot study) covered information needs about treatment, the surgery itself, nursing, anesthesia, nutrition, rehabilitation, wound care, physical activity, fear and anxiety. Participants responded to a structured interview based on the topic list.

In the data analysis, the answers were divided into the following categories: information concerning oneself, fear and anxiety, and surgery and care. The interview responses were analyzed inductively with thematic content analysis. The main issue was to describe the logic underlying how categories, subcategories and themes were abstracted, understood and connected to the aim and each other. Respondent answers were grouped into subcategories of "time" in which the following questions were attributed: how long the surgery will take, when the surgery will finish, and other questions connected with time. Questions connected with surgery technique were placed in the subcategory "technique", i.e. how will the surgery be performed, will a wide surgery cut, how many sutures will there be, is it a complicated surgery, etc. Questions related to fear and anxiety were placed in the subcategory "being, feeling", i.e. is it a dangerous surgery for one's age, will the patient feel pain after the operation, could the patient die during the surgery, etc. The questions of the subcategory about "time", "technique" were attributed to the infor-

mation concerning the surgery and care, the questions of subcategories "being, feeling" were attributed to the category of fear and anxiety, while the questions emphasizing oneself, i.e. what medicine the patient will have to take, how to prepare oneself for the surgery, and others were attributed to the category concerning oneself.

The used coding unit was either a word or a phrase. The coded responses were divided into meaning units after thorough reading of the codes. The meaning units were then divided into sub-themes and further gathered under themes [6].

## RESULTS

Three main themes were seen in participant answers: information concerning oneself, concerning fear and anxiety, and information concerning the surgery and care.

## CONCLUSIONS

The participants lacked information about treatment, nursing, anesthesia, rehabilitation, wound care and about post-surgery period because of which it is possible to assume they feel anxiety. The participants did not receive enough information and they were not included into treatment and nursing processes. The information needs of the participants were different before and after surgery. The benefits of additional information might result in increased patient involvement in decision-making and their ability to cope with stressful circumstances during the diagnosis, operation, and post-operative phases, adaptation to a diet and a stoma. It might also contribute to anxiety relief, reduction in mood disturbances, and better communication with family members.

## PRACTICE IMPLICATIONS

The participants lacked information about their treatment. Knowing what questions are important to the patients, the medical staff could prepare information leaflets, educational plans or something else where the patients will get answers to the most frequent questions they are anxious about.

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# PERI- AND POST-OPERATIVE RESULTS OF INITIAL ROBOT-ASSISTED RADICAL PROSTATECTOMIES OF A SURGEON GRADUATING FROM A STRUCTURED FELLOWSHIP

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A – study design, B – data collection, C – statistical analysis, D – interpretation of data, E – manuscript preparation, F – literature review, G – sourcing of funding

## ABSTRACT

**Background:** No validated training curriculum for robotic surgery exists so far. International scientific societies like ERUS (EAU Robotic Urology Section) seek to validate a structured training program for robotic surgeons. In 2014, ERUS launched Pilot Study II, a 6-month structured training program to allow a surgeon without prior robotic training to perform a complete RARP (robot-assisted radical prostatectomy) independently and effectively.

**Aim of the study:** Here we report the detailed courses and training materials, specific surgical activities and perioperative efficacy and safety results of the first 52 RARP cases performed by a single surgeon after graduating from Pilot Study II. The aim is to compare these results with the literature and show if this sophisticated training helps patients undergoing this type of surgery achieve advantageous perioperative results.

**Material and methods:** The fellowship was conducted from January to June 2014 and consisted of lectures on technical and non-technical skills, as well as e-learning, bedside assistance (at least 20), intensive training consisting of laboratory training (i.e., virtual reality simulation, dry lab (plastic model), wet lab on animal cadavers and living anaesthetized pigs) and dual-console live surgery followed by five months of modular training, where the trainee performed different steps of the surgery at the host center. After passing the final evaluation (a full recorded video of RARP evaluated blindly by robotic experts), the trainee was deemed capable of performing efficiently and safely a full case of RARP. Here we retrospectively report the content of training and perioperative results of the surgeon's initial 52 RARPs performed from July 2014 to April 2015.

**Results:** After graduating from the fellowship, the surgeon performed 52 cases of RARP. The mean patient age was 65.2 years, initial PSA 12.9 ng/ml, prostate volume 43.7 ml in TRUS, BMI 27.5, and 61% of patients had a prior abdominal or pelvic surgery. Because of internal regulations, every patient had a pelvic lymphadenectomy performed, three of whom had positive lymph nodes. The average estimated blood loss was 225.7 ml, and no patient needed intraoperative blood transfusion. The average console time was 174.2 minutes. Final full-mount pathology identified 23 patients (44.2%) with a locally advanced prostate cancer (T3 or T4). Positive surgical margins were present in three cases. A further 29 patients (55.8%) had locally confined disease (T2). Positive surgical margins were observed in 2 cases. Catheters were removed on the 5<sup>th</sup> postoperative day followed by a cystogram, with no urine leakage observed in 96.2% of cases. The safety of the procedure was good with one major (Clavien 4) and 13 minor (Clavien 1 and 2, i.e., uncomplicated urinary infection, urinary retention) complications.

**Conclusions:** The study showed that graduating from an intensive and structured learning program in robotic surgery resulted in a faster learning curve, allowing the trainee to reach high safety parameters in performed surgeries. When compared with already published series, advantageous results could be observed. The study was limited by its retrospective design, the moderate number of patients and variables such as individual motivation, dexterity and attitude of the person in training. The advantages of such training should be further evaluated in controlled, multi-center trials.

**KEYWORDS:** radical prostatectomy, prostate cancer, learning curve, robot-assisted radical prostatectomy



## BACKGROUND

Robotic surgery was introduced 15 years ago, at a time when surgeons lacked validated training curricula to structurally teach the technical and non-technical skills required to perform such surgery in an efficient and safe manner. In 2013, ERUS (EAU Robotic Urology Section) proposed a 3 month-long training program known as Pilot Study I. The results showed that the program was too short, so a longer Pilot Study II was developed. The aim was to create a training modality to teach a novice the set of skills needed to perform robot-assisted radical prostatectomies successfully. The program consisted of e-Learning (e-BRUS), lectures, and 20 bedside assistances during robotic procedures followed by a one-week intensive course at a globally acknowledged training center in Belgium. The trainee was confronted with simulation tasks, operated on artificial and cadaver models, and subsequently on anaesthetized pigs. Upon completion of the training, the fellow returned to the host-facility where they performed steps of the surgery in order to achieve proficiency in every part of the surgery.

Radical prostatectomy was chosen for the procedure to train on, as prostate cancer is the most common malignancy in western countries in men [1-3]. The etiology of prostate cancer is still not fully clear, but risk factors include age and positive family history [4, 5]. Treatment modality depends on tumor stage and patient comorbidities. Radical prostatectomy is one of the main therapeutic options [6]. Radical prostatectomy can be performed in 3 different ways: open surgical, laparoscopic and robotic. The evidence is growing that the minimally invasive robotic approach is associated with fewer complications, less blood loss and advantageous functional results [7-9]. There is also a large body of evidence that surgical outcomes are strongly related to the surgeon's experience level [10-14].

## AIM OF THE STUDY

Aim of the study is to demonstrate the content of the model, intensive training-curriculum and whether this approach results in favorable surgery outcomes. We compare the results achieved by the trainee with historically published ones and determine whether and which safety points can be improved.

## MATERIALS AND METHODS

In the first part of this retrospective analysis we examined the specific content of the training for given surgeon. After completion of an intensive theoretical and practical training, a stepwise approach to performing surgeries was introduced. Robot-assisted radical prostatectomy was divided into 17 surgical steps and the trainee was asked to perform a given number of each step [15]. The crucial steps of the surgery were:

- Bladder detachment – 20 repeats
- Endopelvic fascia incision – 20 repeats

- Anterior and posterior bladder neck dissection – 15 repeats
- Seminal vesicles dissection – 15 repeats
- Posterior prostatic fascia dissection – 10 repeats
- Dissection of the prostate pedicle – 10 repeats
- Nerve-sparing procedure – 5 repeats
- Closing of the dorsal vascular complex – 10 repeats
- Apical dissection – 10 repeats
- Urethrovesical anastomosis – 15 repeats.

After sufficient modular training a full case of radical prostatectomy was performed and recorded. Video was taken of the main surgical steps and blindly reviewed by international experts. After passing this final evaluation, the second part of the study followed.

52 consecutive patients diagnosed with prostate cancer were operated on by the trainee. All data was evaluated retrospectively and written consent obtained from every patient. The study design was observational and patients underwent standard state-of-the-art treatment. The examined parameters included age, BMI, iPSA, Gleason score, prostate volume, previous abdominal surgery, operation time, blood loss, complications, and pathological results including TNM classification, surgical margin status and Gleason score.

In the final part of the study the achieved results were compared with those reported in historical learning curve studies as well as with results from experienced surgeons in order to see if the fellowship resulted in more rapid achievement of better results.

## RESULTS

In the first part of the study, the trainee participated and partially performed 67 RARPs. Altogether he performed 564 single steps of the surgery, from which the most important steps were performed above a set minimum:

- Bladder detachment – 35 repeats
- Endopelvic fascia incision – 25 repeats
- Anterior and posterior bladder neck dissection – 31 repeats
- Seminal vesicles dissection – 27 repeats
- Posterior prostatic fascia dissection – 16 repeats
- Dissection of the prostate pedicle – 14 repeats
- Nerve-sparing procedure – 13 repeats
- Closing of the dorsal vascular complex – 21 repeats
- Apical dissection – 16 repeats
- Urethrovesical anastomosis – 15 repeats.

The final examination consisted of a full surgery. The patient had a prostate cancer of intermediate risk, iPSA 6.3 ng/ml, T1c, Gleason score 7a, and prostate volume of 44 ml. The surgery took 250 minutes and the final pathology showed pT2c pN0 (0/17) R0, Gleason 7b. After international evaluation of the recorded video, the trainee was deemed capable of performing surgeries on their own.

Results of the main part – 52 surgeries performed by the trainee

In 10 months after graduating from the fellowship, the trainee was able to perform 52 robot-assisted radical prostatectomies. The demographic and initial urologic data of the patients is displayed in Table 1. On average, the surgery took 174.2 minutes and blood loss was 225.7 ml. No perioperative transfusions were required. Bilateral nerve sparing surgery was performed in 34.6%, unilateral in 44.2% and none in 21.2% of the patients. Grade 1 bladder neck preservation could be achieved in 51.9%, grade 2 in 46.2% and grade 3 in 1.9% of operated patients. There were no intraoperative complications [16].

The final pathology results were: pT2a-c in 55.8%, pT3a in 36.5%, pT3b in 3.8% and pT4 in 3.8% of the patients. Lymph node dissection was performed on every case and 5.8% of the patients were already N+. The mean number of removed lymph nodes was 14.94. The guidelines recommend removing at least 10 lymph nodes as a quality measure of surgical performance [6].

A positive surgical margin (R1) was detected in 6.9% of organ-confined disease and in 13% of locally advanced disease. There were no R2 (macroscopically incomplete resection) cases.

Table 1. Results

Parameter	Value	
Age (years, mean)	65.2	
BMI (mean)	27.5	
TRUS (ml)	43.7	
Prior abdominal/pelvic surgery (%)	61	
Mean iPSA-Value (ng/ml)	12.9	
Average console time (min)	174.2	
Estimated blood loss (ml)	225.7	
Mean catheterization time (days)	5.5	
T2	55.8%	
T3	40.4%	
T4	3.8%	
N+	5.8%	
Positive surgical margin (%)	T2	6.9%
	T3/T4	13.0%

Postoperative histological grading of prostate cancer was as follows: Gleason 6 in 30.8%, Gleason 7 in 63.5% and Gleason >7 in 5.7% of cases.

Postoperatively, a cystogram was performed to check for urinary leaking in urethra-vesico anastomosis. This was inconspicuous in 100% of cases and the catheter was removed on day 5 after the surgery.

During the postoperative course we diagnosed 15 complications. 14 (93.3%) of all complications were minor, mostly urinary infections and retention. There was one major complication—a postoperative bleeding revised laparoscopically by the trainee themselves.

## DISCUSSION

Compared to other participants in Pilot Study II, the trainee underwent more intense training, performing 67 partial surgeries and 564 single steps of the procedure. The mean for the cohort was 28.4 and 231, respectively [15]. It may have been due to the multi-center design of the training and individual differences in motivation, drive and professional situation.

In order to compare the results of this study, we identified a number of publications addressing learning curves in robotic prostatectomy. Abboudi et al [11] published a review covering 17 series reporting initial results and learning curves. That study was limited by the lack of methodological description of specific robotic training, probably due to a lack of curricula offered in that time. Some authors such as Wolanski et al [17] describe their training, in this particular example, a 3 day course, much less than what was done in Pilot Study II. These differences in study design may contribute to the observed differences in achieved results. When it comes to the number of performed surgeries, other publications are more or less comparable, with 20 to 50 patients each [16-22]. In regard to age and body mass index the results presented here were comparable to those in the literature. In our study the percentage of patients with previous abdominal surgeries (with increased risk of surgical complications) was much higher (61%) than that found in the literature (Mattei et al [23] 28.4%, Horovitz et al [24] 21.2%).

Preoperative oncological parameters such as iPSA, T-Stage, and Gleason score were comparable with the literature.

Average console time is considered one of the most important factors in evaluating the learning curve. The surgery times published by other authors were 145–260 [11], 195.3–371.3 [25], and 190 [17] minutes. These numbers are comparable but higher than the 174.2 minutes observed in our study. Yet another important factor is intraoperative blood loss; here also comparable values were observed: 152–310 [11], 285–725 [25], 200 ml [17] and 225.7 ml in the current study.

Complications rates were also similar with 17–27% [11] and 12.9–19% [17].

When comparing positive surgical margins rates, one can see much higher rates published historically: 5–42% [11], 12.3% [17] and 34.2% [26]. In a meta-analysis covering experienced surgeons, Novara et al [27] demonstrated an R1 Rate of 6.5–32% and a weighted mean of 15%. All historical data are higher than the 9.6% observed in the current study. We hypothesize that favorable surgical and oncological results achieved in this study were due to well-organized, structured performance of surgeries in the high volume host facility.

## CONCLUSIONS

Pilot Study II was a sophisticated, well-designed and structured intensive training program which allowed a novice surgeon to gain sound surgical skills in a rea-

sonable time. Comparison of our results with historical data revealed that the Pilot Study II training curriculum was more intense, presumably the reason for the marginally more advantageous results. This applies mostly to the lower positive surgical margins rate as well as shorter surgeries and less blood loss. The con-

clusions drawn from this study should be interpreted cautiously due to this report's limitations of retrospective design, literature comparison, the moderate number of cases and the single surgeon involved, since results may vary significantly based on individual characteristics.

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# INTEGRATED HEALTH CARE SERVICES AS A CURRENT CHALLENGE FOR PRIMARY HEALTH CARE: REFLECTIONS FROM CRETE, GREECE

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## ABSTRACT

This paper addresses the issue of integrated care services as a current challenge for primary health care in Europe. It is focused on an operational definition of integrated care and documents its relevance to the recent declaration of the World Health Organization regarding primary health care. The paper also reports on experiences gained and lessons learned in Greece, a country where initial attempts towards integration of public health into primary care are currently unfolding. Additionally, it discusses the limited involvement of patients, families, and communities in health care, as well as relative absence of advocacy and care coordination at a policy level. The need for training stakeholders to define and promote integrated care is highlighted as an essential component of translating new concepts into concrete health care actions. Finally, when discussing development and implementation of a well-coordinated and integrated primary health care system, the paper provides ideas for further consideration. The present report is anticipated to open the dialogue between health care professionals, stakeholders, policy makers, and the public towards the integration of health services in contemporary Europe.

**KEYWORDS:** integrated care, primary health care, public health

## BACKGROUND

‘Integrated care’ is a concept that is frequently discussed and has received global attention of many researchers and policy makers. The World Health Assembly defines integrated health services as “health services that are managed and delivered so that people receive a continuum of health promotion, disease prevention, diagnosis, treatment disease management, rehabilitation and palliative care services, coordinated across the different levels and sites of care within and beyond the health sector and according to their needs throughout the life course” [1]. In addition, the World Health Organization (WHO) Anniversary Meeting in Astana [2] recently supported a comprehensive definition of Primary Health Care (PHC) that incorporates three inter-related and synergistic components:

- “(a) Meeting people’s health needs through comprehensive, promotive, protective, curative, rehabilitative, and palliative care throughout the life course, strategically prioritizing key health care services aimed at individuals and families through primary care and the population through

public health functions as the central elements of integrated health services.

- (b) Systematically addressing the broader determinants of health (including social, economic and environmental factors, as well as individual characteristics and behavior) through evidence-informed policies and actions across all sectors.
- (c) Empowering individuals, families, and communities to optimize their health, as advocates for policies that promote and protect health and well-being, as co-developers of health and social services, and as self-corers and care givers.”

Both reports place PHC and essential public health (PH) functions at the core of integrated health services. In simple words, they call for actions towards the integration of PH into PHC, a subject particularly relevant to Greece (see a recent WHO Public Health Panorama paper from Crete [3]). That work attempted to offer a framework on how best to design and rapidly test evidence-based approaches that can serve to address public health priorities, improve health and well-being of the population, and support evidence-informed policy making in Greece.



Based on experiences gained from Crete, the present report aims to highlight potential challenges that PHC may face when integration of health care services is discussed. This approach may be of particular interest for countries with similar health care systems: those where PHC remains under developed, and integration is absent from the health policy agenda.

## **DEVELOPMENT OF A PLAN FOR INTEGRATED CARE IN GREECE: LESSONS LEARNED AND WHAT WE EXPECT**

In 2015, Tsiachristas et al. [4] reported on a detailed analysis of the Greek healthcare system and its challenges for enhancing integrated care. Four years later, several of the interlinked integrated care prerequisites remain particularly relevant.

### **1. Lack of involvement of patients, families, and communities in health care**

Presently, the Greek health system seems to be physician-centered and profit-driven, while little attention is given to the proactive and holistic engagement of patients in the continuum of care. As such, patients remain inadequately informed and poorly educated about health issues (e.g., prevention, behavior change, self-management, pharmacological and non-pharmacological treatment options), thus often resulting in suboptimal and costly medical choices [5,6]. Shared decision making is not a central issue of Greek health care services' delivery, while medical curricula have few courses aimed at teaching patient-centered and compassionate care.

In addition to these structural barriers within the health care system, there are culturally-relevant factors that should be taken into consideration when creating an integrative person-centered health system. For example, in Greece, "family" remains a strong cultural value. Therefore, the accepted social norm is for family members to serve as the patients' caregivers, especially for the most chronic illnesses. Focusing on caregivers is a low priority, while their voice and needs (e.g., for education) are not taken into consideration within the local health care system [7]. Furthermore, Greece's adverse economic situation, refugee crisis, and need for PHC to meet the health and cultural needs of an increased number of people, such influences become even more relevant [8–11].

Moreover, family-oriented PHC remains a challenge for health care policies--not only for Greece, but also for many other European countries. Engagement of resources, capabilities, and needs at the community level--both in terms of local administrative entities and peer-influencers and representatives--is crucial for inclusion in any integration planning. This effort requires broad and systematic education of a wide range of stakeholders (including patients and caregivers) and

provides extensive thought for discussion pertaining to tailored methods and approaches [9].

### **2. Training of stakeholders to define and promote integrate care**

Although Greece's political parties frequently discuss integrated care, the need for a concrete definition, along with a comprehensive conceptualization and understanding of, the term remains ambiguous. This may partially explain the difficulty of converting new concepts into a sound health care policy that considers patients' views, expectations, needs, and values [12]. Critical questions to answer in order to make progress in this direction are as follows:

1. Who should be educated or trained on integrated care?
2. What are the best methods to provide education/training on integrated care?
3. What are the optimal venues for providing education on care integration?

The foregoing could lead to an important dialogue with the School of Health Sciences of the University of Crete, which has the task for updating educational programs and incorporating health care integration. Creating consensus around upgrading the academic curricula of a broad range of health and social sciences with special emphasis on integrated care, synergies, and multidisciplinary teams--from theoretical reasoning to practical implementation--may be an important challenge towards this direction. To facilitate transformation of the undergraduate training agenda, introducing clinical examples in the debate and discussing the impact of integrated care in several aspects, including its link to empathy and compassion, are important [13,14].

For instance, there is an ongoing discussion on the importance of active and healthy aging and prompt attention has been given to early recognition of frailty and its associated adverse outcomes, including fragile fractures. Focusing on frailty when addressing the issue of integrated health services is critical for many reasons. First, it is a multi-dimensional clinical entity that includes cognitive, physical, and mental components. Second, it implies several communication and clinical skills, such as diagnostic, curative, rehabilitative, and palliative. Third, the interface of PHC professionals with a patient that is progressively declining and a family that is affected with a growing burden indicates the relevance of this clinical entity to integrated care. Fourth, managing frailty involves not only several medical disciplines and specialties (general practitioners, cardiologists, neurologists, oncologists, and internists) but also invites an interdisciplinary health care team to work together with patients, families, and communities. And fifth, it also implies interventions from various domains apart from that of health care, including the social, education, housing, environment, and transport sectors [15].

### 3. Lack of advocacy and care coordination

A welcome effort has been recently introduced in Greece to structurally reform PHC and provide a more coordinated care system. However, the road to comprehensive and continuous care provision that allows for referral, information sharing, and skills exchange across the different healthcare sectors remains uncertain and uncharted. The interface across hospital, mental health, public health, and social health, and primary care, requires much for further discussion. Presently, there is an obvious absence of respective interventions and experimental work.

Additionally, with low budgets, workforce allocation and motivation have yet to receive the needed reform and support. Private practice remains the most profitable sector of care, as decreases in salaries, accompanied by increases in workloads of public healthcare professionals--along with limited infrastructure, technology, and support and administrative personnel-- hamper provision of equitable, multidisciplinary, integrated care. Bringing together the separately-functioning authorities, including health, public

health, labor, and social care, is an essential, yet challenging, action may help mitigate the foregoing predicament.

### CONCLUSION

The integration of PH into PHC could be a first step to initiate discussion about integrated care in European settings. It could facilitate implementation of the second stem that will link primary care with mental, hospital, and social care. Training and empowering patients, families, caregivers, health professionals, and policy makers to define and promote integrated care seems imperative. The use of clinical entities, such as frailty care, to guide design and refinement of new educational curricula that incorporate integrated, patient-centered, and compassionate care may also facilitate understanding of necessary actions for fostering health care reform. This short report seeks to open the dialogue between health care practitioners, stakeholders, and policy makers on integrated health services in contemporary Europe.

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# CAN COMMUNITY AND HOSPITAL MEDICINE MEET? A NOVEL INTEGRATIVE CARE EXPERIENCE AT ASSUTA UNIVERSITY MEDICAL CENTER

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## ABSTRACT

The ageing of the population, along with the rise in chronic complex illnesses, requires extensive interprofessional, individualized care, mainly in the community, but also in hospitals. Fragmentation results in suboptimal care, higher cost due to duplication and poor quality of care. Hence, collaboration between health systems is essential to prevent further complications and provide enhanced medical care to patients. Integrative care creates bridges between community and hospital health. Integration should be pursued at different levels within a system to facilitate the continuous, comprehensive, and coordinated delivery of services to individuals and populations. To be applied and to make a difference in patient care and outcome, its significance needs to be understood and embedded at the management level. Health systems should abandon familiar paradigms and collaborate with other health systems on the macro level. Several studies describe integrative care from its different aspects. Division of integration into levels: systemic to clinical, horizontal vs longitudinal and according to the degree of integration (from linkage to full integration). Maccabi Health Services is the first Israeli health organization to place an integrative care team at Assuta Hospital in Ashdod. The multiprofessional team, situated in the hospital, sees every Maccabi patient in the hospital. Through close communication and collaborative work with the hospital team – a shared continuity of the care plan is prepared. The team coordinates future care in the community from the hospital to ease the release process and improve outcomes.

**KEYWORDS:** integration, multiprofessional, collaboration, continuity of care

## BACKGROUND

Society is ageing concurrently with improvement in healthcare. Paradoxically, the number of chronically ill patients is increasing. The complexity of their illnesses requires an interprofessional support system to manage their care. Community health takes the leading role in the treatment of these patients [1]. Yet, during their illness exacerbation and health deterioration, acute care centers, hospitals, and secondary care institutions are crucial components of their treatment. In addition, newly hospitalized patients with no chronic medical condition can unexpectedly encounter a new illness which requires continuation of care in the community.

The importance of health system collaboration cannot be emphasized enough. Lack of communication leads to medical errors, repeat hospitalizations, extra medical costs, patient dissatisfaction, and poor patient outcomes. During the patient discharge period, such collaboration and communication are especially important. At this critical time, the frail patient faces numerous barriers from different community services, while trying to follow hospital recommendations [2].

The EU Expert Group on Health Systems Performance Assessment report defined integrated care as the following: “Initiatives seeking to improve outcomes of care by overcoming issues of fragmentation through linkage or co-ordination of services of providers along

the continuum of care” [3]. It aims to provide a seamless continuum of care at the patient level, as well as augmented effective use of limited resources at the organization level. Its guiding principle across levels of care is the health system’s accountability to its patient population [4].

Shortell et al. (1994) divided integrative care into 4 levels: Ranging from clinical integration, that is person focused at the micro level, to systemic integration, that is population based at the macro level (Fig. 1) [4,5]. Leutz (1999) refers to integrative care as longitudinal or horizontal. Horizontal integration connects different services on the same treatment level (e.g., services in the community). Longitudinal integration means collaboration between different health systems at different levels of care (e.g., hospital and community) [6].



Figure 1. Different levels of care integration.

Integrative care ranges from linkage (occurring between existing organizational units) through coordination (entailing a more structured type of integration but still operating largely through existing organizational units) to full integration (pooling resources of different organizational units to create a new organization). There is a correlation between a patient’s needs and level of integration needed from the health system (Fig. 2) [7].

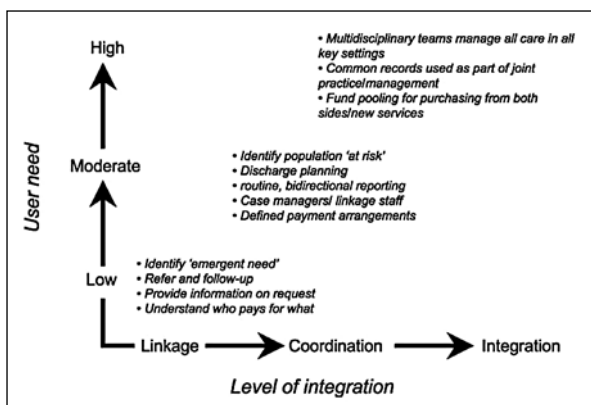


Figure 2. Setting the level of integration against user need to optimise care.

To achieve effective integration, an appreciation of the importance of a good relationship between primary

care givers and the health organizations is required. Barriers such as mixed financial incentives, lack of communication between clinical information systems, absence of adequate geographic concentration of facilities, ambiguous roles and responsibilities, inability to execute the system’s strategy, and incapacity to “manage” managed care limit the power to apply integrative care as extensively as expected.

In summary, integration requires creating an organizational and systemic platform to provide comprehensive patient care. Maccabi Health Services Community Health Organization, in collaboration with Assuta Ashdod Hospital, has adopted the integrative care model. It is the first health organization in Israel to create a hospital-based community integrative care unit.

Assuta Ashdod University Medical Center opened on November 1, 2017. It is the first hospital in Israel to define itself as a community-oriented hospital. The Maccabi Health Service integrative care unit began working in accordance with the opening of the hospital. The unit comprises an interprofessional team including a medical director (a family physician also practicing in the community), administrative director, nurses, social workers, dietician, physiotherapist, clinical pharmacologist, and medical secretary. The team is situated in the hospital, with staff on duty during the entire day.

The goals of the unit are ensuring continuity of care between hospital and community services for the Maccabi patient and creating a bridge between the hospital and community medical staff, and thus preventing prolonged and unnecessary repeat hospitalizations, effectively utilizing resources, and improving patient satisfaction. The target population includes every patient who is a member of Maccabi Health Services in the inpatient and outpatient setting. Treatment is based on patient needs, ranging from administrative services to multiprofessional patient care and release plan, including referral to appropriate continuity care institutions (e.g., rehabilitation, hospice). The integrative care team receives a daily list of all inpatients and their clinical condition. Members of the team visit every patient at the bedside and evaluate individual medical and social needs. The appropriate staff members are involved, and the hospital staff is consulted about certain patients. Hospital case managers also locate patients and identify their needs and deliver the information to the team. The integrative care team creates an individual release plan for each patient and begins coordinating continuity of care with community services at the outset of the hospital stay. Patients from the ER or the outpatient settings are located by hospital staff and referred to the team. The patient’s primary care physician is contacted and receives an update. Upon release, the patient returns to the community with all appointments arranged in advance. Follow up is provided to the hospital staff from the community (Fig. 3).



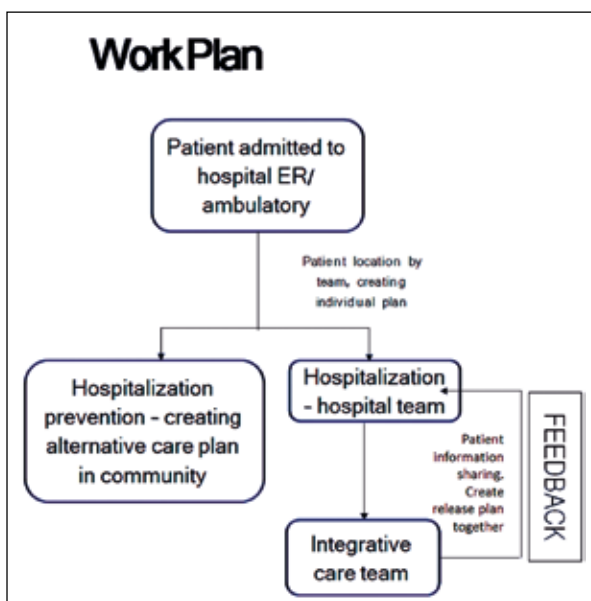


Figure 3. Work plan for Maccabi patient entering Assuta Ashdod Hospital.

Additional roles of the medical director include a „learning together” monthly program where community and hospital physicians meet to learn a clinical

topic together. A clinic for hospital employees is also run by the medical director. This fosters familiarity with hospital personnel and brings the community into the hospital by providing community services in house for staff. Evaluation and feedback are preformed daily. Data are collected regarding patient satisfaction, hospital and community health staff satisfaction from integrative work with the team, length of hospital stay, number of referrals to continuity care institutions, and the like. Preliminary data after being in operation for approximately 16 months demonstrate that the program has led to shorter hospital stays (owing to community solutions, such as IV treatment), reduced unnecessary repeated hospitalizations, decreased costs, and improved patient and staff satisfaction (data collection is still in process).

In summary, integrative care addresses the challenges of the aging, complex, chronically ill society. The continuity of care between hospital and the community improves patient outcomes and has an impact on all levels of healthcare. Collaboration between the hospital and community at the management level creates opportunity to provide better care at the individual patient level.

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# BEHAVIORAL HEALTH AND NEW MODELS OF SERVICE DELIVERY FOR AN AGING WORLD: PUBLIC/PRIVATE PARTNERSHIPS TO DEVELOP BEST PRACTICES OF CARE FOR OLDER ADULTS

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## ABSTRACT

Individual and societal initiatives in areas of research, education, and health care policy have resulted in unprecedented gains in life expectancy. It is true that today more people in the world are living longer and have opportunities for higher quality lives than ever before. However, the resulting rapid rise in number of older adults has become a source of concern: Experts of many countries, in anticipation of looming problems, such as overburdened health care and pension systems, are now seeking opportunities to work together to find common solutions for globally-shared problems. The good news is that while all countries are experiencing change brought on by aging populations, the rate of change varies substantially from country to country; differences in historical events have produced differences in demographic profiles. Some countries have relatively large numbers of older adults, comprising large percentages of their populations; others have fewer older adults, with slower growth in numbers and percentages of older adults relative to other age groups. These differences have led to variations for the type and pace of response mounted by individual countries for problems associated with increasingly large older adult populations. In turn, these variations in response provide opportunities for countries to learn from one another. This brief review will outline potential issues associated with aging populations and discuss strengths and challenges for the integration of primary medical care with behavioral health as an innovative, best practices approach to the provision of care for aging persons of the world.

**KEYWORDS:** global aging, best practices, evidence-based practice, integrated care, behavioral health

## BACKGROUND

Global aging is often described as a great achievement of the 20th century; advances such as better nutrition, reduction in infectious diseases, and greater access to medical treatments have led to significant increases in life expectancy. It is true that today more people in the world live longer and have opportunities for higher quality lives than ever before. However, the resulting increase in number of older adults has also brought other issues to the fore: Gerontologists now note the eminent need for policy discussions to address the increasing incidence of late-life, health-related conditions [1] and the growing worldwide shortage of health care professionals and care workers for older adults [2,3]. Experts in aging studies increasingly recognize the burgeoning crisis in workforce recruitment of too few younger persons and call for new perspectives on older adult workers [4,5] and age of retirement [6]. Aging researchers and specialists are working to

understand late life solitude [7,8] and develop interventions to offset loneliness and mental health disorders resulting from social isolation [9]. The scientific literature for these and other issues clearly indicate that proactive steps need to be taken to avoid the potential, long-term, negative consequences of not understanding older adults as unique consumers of care. The recognition that all countries are now stakeholders in the global aging phenomenon has highlighted the need for gerontology professionals of the world to work together to find common solutions for common problems.

## DEMOGRAPHICS

A substantial body of research is available to provide direction for understanding the increases in life expectancy now seen throughout the world. All studies, including those focused on behavior of individuals [10,11] and those reporting on societal initiatives

[12,13], reach the same conclusions: Countries making significant investments in education and research, particularly in the sciences and medicine, and in the development and implementation of safety regulations, through public and health policies, are showing substantial and unprecedented gains in longevity for citizens.

When life expectancy gains are measured against fertility rates and examined next to population projections, a bigger picture emerges: Regardless of whether population gain or loss is experienced over the coming decades, the growing number of older adults for a country will be reflected as an increasingly large percentage of its population. This shared reality of changing demographic profiles is called global aging and prompting countries to refocus resources toward older adult issues. That these demographic shifts toward aging populations are expected to gain momentum through at least 2050 [14] is now becoming a global source of concern.

### BEST PRACTICES

While all countries are experiencing change brought on by aging populations, the rate of change can be seen to vary quite substantially. Differences in historical events have produced relative differences in demographic profiles, which, in turn, have led to significant variation for the type and pace of response mounted by individual countries for problems associated with increasingly large older adult populations. This variation provides opportunities for countries to learn from one another.

The sharing of information for best practices of care is one way to address needs of older adults now and in the future. A best practice is broadly defined to include any practice or method empirically supported to be the best, agreed upon way to successfully accomplish a task [14]. The concept has gained wide purchase in the sciences, but also in business, education, and other areas of study that include application of practical knowledge. A similar, overlapping construct for healthcare professions is that of evidence-based practice, which includes the integration of scientific knowledge with clinical expertise, values of patients, and available resources to improve patient outcomes [15]. The similarities of best practice(s) and evidence-based practice appear to be obvious: both are intended to promote consistency of program development and practice, through development of guidelines; and, both call for the examination of what has and has not worked, through study of the ever-growing, global knowledgebase and by personal communication exchanges of information. Any model of care rooted in best practices and adopted for use with older adults can be tailored to meet cultural needs of specific countries. As best practices information is developed and disseminated by countries currently experiencing high percentages of older adults and already moving to formulate and implement policies and programs [16,17], professionals in countries

with relatively smaller percentages of older adults, who may at this time acknowledge a greater focus on direction of resources toward concerns of youth, can nonetheless begin to work in anticipation of future needs and, hopefully, offset problems produced by their own growing older adult populations.

### BEHAVIORAL HEALTH – PRIMARY CARE INTEGRATION

Behavioral health is a relatively new term for care that “...encompasses prevention, intervention, and recovery from mental health and substance use conditions” [18]. Although behavioral health and mental health are sometimes thought to be the same, the focus of behavioral health includes in equal emphasis to mental health conditions the promotion of health and wellness behaviors. The use of the term behavioral health is gaining widespread acceptance in clinical applications as it avoids stigmatizing labels attached to the concept of mental health, acknowledges behavioral involvement in mental health conditions, and includes the possibility of behavior change as a critical component of modern approaches to healthcare.

The integration of primary care and behavioral health (PCBH) serves as an example of both best practices and evidence-based practice and offers a new perspective, which is proving particularly relevant for aging populations [19]. This team-based model employs a biopsychosocial approach to service delivery, which utilizes complementary skill sets of behavioral health professionals in primary care practices [20]. Team members representing biological (i.e., medical), psychological, and social aspects of care, each responsible for specialized areas of expertise engage in task sharing (i.e., task shifting) to make best use of provider resources [21]. Under the direction of a physician, nurses and nurse practitioners, mental health providers, social workers, community health workers, and other specialists work together to provide comprehensive care and promote best short- and long-term outcomes for patients [22].

The body of research supporting PCBH comprehensive care has grown rapidly in the last decade. Studies are available that report improved treatment outcomes, reduction in costs, promotion of independence within communities for patients, and increased satisfaction for both patients and providers [20,23,24]. Further, research now empirically supports that PCBH allows for the development of interventions targeted to social and psychological factors related to medical care outcomes. Such issues as loneliness and social isolation [25,26], depression [27], anxiety [28], elder abuse [15], trauma-related problems [29], and additional emotional and mental health needs [30] are being assessed and treated effectively by PCBH.

Despite the benefits and promise of PCBH, challenges exist that must be addressed for this new

approach to reach its full potential as a true biopsychosocial model of comprehensive care. Research supports that older adults usually consult primary care physicians as a first point of contact with the health care system, even in circumstances when a suspected mental health issue has prompted the contact. The traditional model of medical care, still in effect for most forms of medical practice, has worked very well for illness and injury, with primary care referrals, when necessary, typically focused on medical problems [23, 31]. Outside of the integrated practice, however, gaps have been identified for mental health and substance abuse issues that in the traditional model are treated without utilization of the skills of behavior specialists [23]. The PCBH model addresses this: Specialists with training in the use of tools for behavioral assessment are employed to evaluate mental health and substance-related problems, which are now shown by research to be comorbid with a wide variety of acute and chronic health conditions seen in older adults [32,33]; behavioral assessment results can be provided before the primary care physician conducts a medical evaluation or in response to a referral, in cases when the physician suspects a behavioral health issue is involved in the presentation of medical symptoms. In the U.S., issues related to mental health are the leading cause of disability, with fewer than 20% of persons receiving needed care. That evidence-based treatments in mental health closely correspond to evidence-based treatments in medicine provides a strong foundation for the integration of mental health into the primary care setting [31]. The comprehensive PCBH approach is proving beneficial as an extension of medical care in the mental health arena; among its benefits beyond the addition of behavioral assessment are the ability to offer brief and longer-term behavioral interventions and the provision of a means to develop and direct community support for follow-up care, particularly in low access, low resource, underserved areas [19,30,34].

Additional challenges for the PCBH approach are definitional in nature and include the need to resolve such practice issues as professional boundaries, maintenance of patient confidentiality from the integrated practice into community-based support systems, and reimbursement for professionals other than physicians working within the PCBH practice [30,35]. Although physicians are the acknowledged directors of PCBH teams, there are often included in the PCBH model other licensed professionals, who have the ability to directly bill clients and third party payment systems (i.e., insurance providers) for their services, and who may be responsive to practice guidelines developed by disciplines other than medicine. These concerns should be resolved as PCBH matures and consensus is reached among professionals concerning just what constitutes evidence-based practice for PCBH and which models deliver best practices for older adult outcomes [31].

## CONCLUSION

Demographic shifts toward increases in percentage of older adults are impacting the global landscape in predictable ways. New perspectives are emerging for basic issues of aging, such as what it means to be old – e.g., many current policies for retirement in place around the world were based on decades-old perspectives on definitions of aging and health status [36]. Also, rapid increases in the number of older adults with specific conditions are leading to expanded models of health care that include more formal and informal service provision by non-medical, multidisciplinary personnel. This is supported by the global shortage of gerontology and geriatric specialists trained in unique aspects of older adult care [2,37–39]. While talk among healthcare professionals over the last couple decades has been directed toward efforts to attract interested persons to specialties of older adult care, it is now clear that recruitment efforts have fallen short: simply put, there are not going to be enough specialists available for most societies to meet the needs of large percentages of older adults. This situation is creating a “global marketplace” [2, p. 950] for specialists and already impacting both developed countries [39] and emerging countries that have historically imported medical personnel [37].

A related issue is a global rise in need for workers who provide direct, informal care of older adults [40]. In the United States, most long-term, informal assistance is nonmedical and non-technical in nature, includes an average of 20-25 hours of unpaid assistance per week, and is typically provided by family members in the home setting [41, pp. 325–327]. In fact, the amount of care provided for elders by their adult children in the U.S. has more than tripled over the last 20 years and is expected to continue to increase. This is due, in part, to the desire of people needing care to remain in their homes [42], but also to economic realities of growing health care costs and expenses associated with institutionalization of elderly persons for issues that can be addressed outside of formal healthcare settings. Growth in informal care needs is paralleled by significant growth in public and private models of home-delivered medical care, which will also continue to increase along with the number of older adults and the concomitant rise in assistance needs for conditions such as neurocognitive disorders (i.e., dementia conditions, including Alzheimer’s disease).

The new practices of tele-health are gaining empirical support as useful adjuncts to integrated primary care to help reach older patients overcome such barriers as lack of transportation and work schedule conflicts [43]. The optimal PCBH situation of co-locating professionals for mental and physical health together, in the same facility is not always possible in rural or large geographic regions with few providers; this is especially true for mental health specialists, who are known to be highly underrepresented outside of urban areas [44]. The use of technologies may be able to reach some older adults with mental and/or physical health



concerns, but brings with it the issue of health literacy. Many otherwise literate, older persons are not familiar with and/or do not have access to internet-based technologies, which are increasingly used in lieu of written information (e.g., instructions); recent reports indicate most older adults still prefer direct communication with primary care providers and word-of-mouth to access information for health-related issues. Computer-based access and know-how are increasingly common for young and middle-aged adults and may in time signal an important shift in use of virtual technologies in care provision. However, the current lack of these skills

for older adults will continue in a shorter time frame to negatively impact their functionality, even as telehealth approaches gain ground [45,46].

In sum, the integration of behavioral health and primary care is providing new direction for the expansion of traditional healthcare to include mental health and substance abuse issues and reach into previously underserved areas to address largely unmet needs. The opportunity in the developing models for specialists to become partners in integrated care promises to result in a true biopsychosocial, comprehensive care and enhance the quality of care for older patients.

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# THE ROLE OF THE UNIVERSITY CENTER FOR SOCIAL DEVELOPMENT IN THE REGIONAL INNOVATION ECOSYSTEM OF SOCIAL ASSISTANCE

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**A** – study design, **B** – data collection, **C** – statistical analysis, **D** – interpretation of data, **E** – manuscript preparation, **F** – literature review, **G** – sourcing of funding

## ABSTRACT

The stable innovation system generation is one of the Russian economic policy priorities. Universities have the role of a central hub in the regional innovation systems formation. This article presents a study of factors influencing the formation and development of the university's innovation environment and examples of innovation activities of the Krasnoyarsk State Pedagogical University V.P. Astafyev (KSPU) in the regional innovation ecosystem of social assistance.

The second section of the article is devoted to the exchange of experience and the results of the university becoming the center of social development in the regional innovation ecosystem of social assistance. An important aspect of this part is a positive result in several key areas: Globalization - mobility and increased competition between universities in China, South Korea, Japan, Poland, Germany, France, Lithuania, Belarus, Ukraine, Kazakhstan and the United States; Multidisciplinary and Interdisciplinary - the integration of science, technology and design, teams from different faculties and universities; and Corporatization - specialized institutes of applied research, and extension of stakeholders.

The final section presents the Transformation Program of the Krasnoyarsk State Pedagogical University at the University Center for Social Development of the Krasnoyarsk Territory for current and future operations. The program includes both initiatives and ongoing projects. Today, many successful examples prove that the Center for Social Development in the field of social assistance of the Krasnoyarsk State Pedagogical University plays an important role in the development of the region.

Conclusion. Krasnoyarsk State Pedagogical University really stands on the route to the social entrepreneurship development and influx of new technologies, introduction of innovative approaches, and becomes the center of social and project competencies of the Krasnoyarsk Territory, one of the leading drivers of social development and of social assistance of the region.

**KEYWORDS:** innovation activities, Krasnoyarsk State Pedagogical University, center for social development, social assistance

## BACKGROUND

Innovation is commercialized knowledge, as defined by author of the innovation theory of development, Joseph Alois Schumpeter [1]. Innovation can be defined here as introduction, development, and operation of new value-added products (services rendered) in the social and economic spheres; update and expansion of

social services, markets for services; development of new social technologies; and the creation of new control systems. This is both the process and the result [2].

Beginning with a view of the role of Universities in the globalizing world and the condition of the higher education system, the authors present the factors/innovations affecting the regional development as well as

those that exert the strongest influence on long-term regional development. The future of innovation, the development of digital information technologies, and the creation of network universities (despising national borders between states) are also discussed [3–9].

In 2017, the Agency for the Development of Innovation Activities of the Krasnoyarsk Territory, presented a report “The role of the University in the regional innovation ecosystem” [10]. It investigated factors which have influence on university’s innovative environment formation and development. Challenges for a modern university were also identified for the Krasnoyarsk Territory.

### TRANSFORMATION OF KRASNOYARSK STATE PEDAGOGICAL UNIVERSITY NAMED AFTER V.P. ASTAFIEV IN THE UNIVERSITY CENTER FOR SOCIAL DEVELOPMENT, KRASNOYARSK REGION

The Krasnoyarsk territory is a pilot region of Russia for the transfer of public services in the social sphere to non-governmental organizations. Work is actively carried out with representatives of ministries and departments of the social sphere, and socially oriented non-profit organizations. In 2017, Krasnoyarsk social non-profit organizations received the following percentages of budgetary funds from state programs: social policy - 0.37%; education - 0.41%; health care - 0.01%; culture - 0.1%, physical education and sport - 36.1%.

In general, the socially oriented policy of the Government of the Krasnoyarsk Territory is aimed at activating civil initiatives, creating a competitive market for social services through the development of social entrepreneurship, socially responsible business, socially oriented non-profit organizations, influx of new technologies, and introduction of innovative approaches [11].

Currently, Krasnoyarsk State Pedagogical University named after V.P. Astafiev (founded in 1932) is one of the leading pedagogical universities of Siberia and Far East. The Independent Public Council of the “100 Best Universities of Russia” contest awarded the university a diploma in the category “Best Socially-Oriented University” three times in a row.

The following questions were used to investigate the role of the university center for social development in the regional innovation system of social assistance:

1. What subjects and positions assume the tasks of implementing technological innovations and, as a result, the effectiveness of the activities of the university center for social development?
2. What kind of relationship scheme is possible between those who are responsible for thinking, creating mental products, those who are responsible for making decisions and translating these ideas, for education?
3. Who is responsible for producing innovation?

### GENERATION OF KRASNOYARSK STATE PEDAGOGICAL UNIVERSITY

Krasnoyarsk state pedagogical university has passed and is following the same generation paths as other universities (tab. 1).

The first generation university (University of Bologna) was focused on education. The second generation (Humbolt University Berlin) introduced the additional key goal of scientific research.

The third generation of university was initiated by Cambridge University, adding the element of valorization. It means, in this case, the initiating market innovations, helping startups, and bridging the gap with social applications by bringing the ideas outside the university. In this way, the usual functions (educational and scientific) are complemented by the entrepreneurial function.

The university becomes a key subject of regional innovation systems, a leader and a center for the creation of new technological developments. In doing so, it makes a significant contribution to the competitiveness of the region; work becomes more interdisciplinary, the focus is on training quality not just for students, but also employers, and on how employers can create value. It points out that the competitive edge of developed economies mainly relies on their ability to create and utilize knowledge [12]. Thus, university becomes not only good performer of educational and scientific developments, but also a generator, coordinator, and creator of new technological innovations in the social market [13].

Modern economic development demands that due to the increased engagement towards the society and economy, traditional activities of universities should

Table 1. Generations of universities [11]

University 1.0	University 2.0	University 3.0	University 4.0
Scholastic teleological	Classical Humboldt	Polytechnic/social school entrepreneurial	Innovative cluster of innovations and social entrepreneurship
Reproduction and transmission of culture	Production of new scientific knowledge	Personnel training	Production innovation Benefit from know-how
Education	Study Education Transfer to the social sphere of scientific research	Social activities	Innovative Development Technology transfer Research Education
Educated person	Researcher	Specialist of social orientation Entrepreneur	Organizer Manager Technological entrepreneur Researcher

be diversified [14]. It is also necessary to maintain high standards in quality education regarding research activities, and to promote the utilization of results in the local economy [14,15].

The authors agree with M. Steinbuch [15], that research processes themselves are still very *linear*: research begins with a thorough survey of literature, innovation follows, then a paper is written and submitted, the author receives reviewer feedback after three months or so, modifies the article and submits again, and after one or two iterations hopes to have it published one year later. This process is repeated several times and, after a few years, the author's Hirsch index may increase by one. As a result, a young scholar may receive promotion to the next academic level after several of such iterations. However, the academic world is changing fast. Linear thinking and linear processes are replaced by exponential growth using the power of new platforms (i.e. networks), and circular processes.

There are many statements and observations in the discrepancy between the pace of university research and its environment, one of the reasons is the high pedagogical load, ranging from assistant to professor, averaging 900 hours / year. Although, it is understood that high quality research requires time and dedication.

## KEY AREAS OF KRASNOYARSK STATE PEDAGOGICAL UNIVERSITY

The university seeks to improve the system of continuing professional education and regional innovation infrastructure; integrate intellectual resources in the field of research and technological development; implement the concept of a university social development center creation in the Krasnoyarsk Territory with the inclusion of not only developments, but also market initiatives - introduction of high technology products in the social sphere [16].

Table 2. Key positions of Krasnoyarsk state pedagogical university

Positions	Activity
University teacher	Broadcasting and reproduction of culture
Social researcher	Basic and applied research Design, life cycle "idea - design - implementation - management"
Social technology entrepreneur	Creating a company on the basis of new innovative developments, technologies, services

## CHALLENGES FOR A MODERN KRASNOYARSK STATE PEDAGOGICAL UNIVERSITY

### I. Globalization: mobility and increased competition between universities.

Academic exchange of students is carried out with universities of China, South Korea, Japan, and France. Students also traveled to China and Poland for short-

term educational programs. Internships and conferences were held at universities in Poland, Germany, China, USA, France, Belarus, Ukraine, Kazakhstan, and Lithuania. Cultural and educational cooperation has been established with China, South Korea, Poland, Germany, China, and Belarus. The development of educational programs at the international level with the participation of universities in other countries is continuous.

### II. Multidisciplinary and interdisciplinary: the integration of science, technology and design, teams from different faculties, universities.

Student Teams: the corps of public observers, Designer of educational environments, Social design for the 2019 Universidad volunteers. The priority multidisciplinary and interdisciplinary projects at the university over the past 2 years have become centers of pedagogical competence within the framework of the movement Young Professionals (World skills Russia) Internship [17], as well as centers of technological excellence. Constant advanced research and design activities are conducted in polyprofessional groups. Traditionally, places of such interaction are basic research and innovation platforms, laboratories of departments in educational organizations, social services for the population, and youth policy. University Centers of technological excellence are currently one of the key elements of the modern innovation system of the university and are multi-competitive research associations of specialists in various fields, combined with practical experience.

A special direction of research and development in centers of technological excellence is devoted to solving the problems of inclusive education. The development of the projects of the International Institute of Autism of the University led to the design of the package of diagnostics and correction of sensory-perceptual disorders in autism and similar conditions; the Center "Technologies of formation (preservation and maintenance) of the psychological health of children and adults." In a specially designed online course for teens "I choose life!" (Mental hygiene and psychological safety of school and everyday life), students can learn self-education and self-development techniques.

### III. Corporatization: specialized institutes of applied research, extension of stakeholders.

Hackathon - a special type of private-state partnership in the training of future specialists. Comparison of products developed by graduates with different experiences of participation in project training showed that the best were teams that included graduates of the specially organized KSPU's two-year Honor's Educational Designer Program [18].



## **KRASNOYARSK STATE PEDAGOGICAL UNIVERSITY AS UNIVERSITY 4.0. PRINCIPLES OF FUNCTIONING**

The Center for New Economic Activities, Market orientation seeks to create High-Tech Clusters of Entrepreneurial Firms in the social sphere; retain a link between the development of Fundamental Science and Final Practical Applications of its Results. In addition, it seeks to improve cooperation with employers: cooperation with universities with know-how and experience in basic research for corporate "Research & Development" in solving specific problems of entrepreneurs in the social sphere.

## **TRANSFORMATION PROGRAM OF KRASNOYARSK STATE PEDAGOGICAL UNIVERSITY INTO THE UNIVERSITY CENTER FOR SOCIAL DEVELOPMENT OF THE KRASNOYARSK TERRITORY**

The Transformation Program created project-oriented a higher and additional professional education system in the university; expert support of programs and regional projects of social development; real participation, including student start-ups, and university lecturers in priority projects of the region development. Some of the projects are already implemented in practice to a certain extent, and the list can be longer.

Several excellent examples have origins in 2015 (and continue today) when employees of social sector were placed at the university to deepen their knowledge in a magistracy. Students take part in teaching and certification, giving inspiration to the scientists. One such example is the joint implementation of the Krasnoyarsk Territory "Active Longevity" project – a priority project for social development. The Ministry of Social Policy of the Krasnoyarsk Territory has responsibility for implementation.

Project goal: create a set of conditions increasing the duration and improving the quality of life of the older generation, by introducing the best social practices of active longevity for the elderly.

Directions and activities of the project:

I. Preserving and strengthening the health of senior citizens:

- creation and development of the geriatric service;
- development of a system for provision of social and health services;
- holding sports events with the participation of senior citizens;
- carrying out outreach work with senior citizens.

II. Involvement of senior citizens in social, labor and creative activities:

- expansion of regional people's university «Active longevity» network;
- increasing the computer literacy of senior citizens;

- promoting the employment of senior citizens, vocational training and additional vocational education for senior citizens, who are seeking to resume work their activities.

III. Development of social partnership:

- "Young for the Elderly" - implementation of flagship programs aimed at involving young people in volunteering to help older citizens, social volunteering;
- "Elderly to Elderly" - providing discounts to public organizations of veterans in order to recover the costs associated with conducting socially significant events and providing consulting services for older citizens;
- "Elderly to young people" - carrying out the events by public organizations of veterans on patriotic education of youth, transfer of knowledge and life experience.

Project performance indicators:

1. The increase of life expectancy (from 72.4 to 76 years);
2. The number of older citizens who have been trained under the Active Longevity Project, as well as employed citizens (an increase from 4300 to 18650 people);
3. The share of senior citizens participating in socially significant activities in the total proportion of senior citizens (an increase from 10 to 25%).

Activities of the project «Active longevity», which will involve Krasnoyarsk State Pedagogical University include:

1. Interaction in the implementation of measures to expand the network of the regional people's university «Active longevity»: preparation of scientific and methodological support of the project activities, monitoring its sustainability and effectiveness with the involvement of professors and students of the Institute of Social and Humanitarian Technologies of the KSPU, forming a list of areas (subjects) of training demanded by older citizens in which undergraduates and graduate students will prepare lectures in the framework of scientific and educational practice;
2. Interaction with the socially-oriented non-profit organization "Good Work" to involve young people in social volunteering, increasing the number of KSPU volunteers;
3. The interaction of the KSPU with the involvement of professors and students of the Institute of Social and Humanitarian Technologies in diagnosing and solving a number of problems contributing to improvement the older generation quality of life, assessment of the results / efficiency of the action plan (on basic and scientific-innovative platforms).

One such initiative is the introduction of innovative approaches - special practical training on the basic scientific and innovative sites of the University in the



last year of study, the so-called “Internship”. Students are trained and contribute to solving a number of problems associated with improving the older people quality of life, i.e. promote different types of employment, social and labor adaptation for the elderly. It should be noted that people of more than 60 years old, who fall into the project “Active Longevity” receive comprehensive services from social services, educational structures, etc.

The state and local governments understand that they cannot respond to all requests from citizens. Therefore, they provide tools for the privatization of social services. A new generation has appeared in Russia, which hopes not for the state, but only for itself. These are very creative young people, while more of them are among those who want to work for themselves [19].

*What about the elderly? Are they aware of social business and the opportunities that they have?* They have mentor-students. Through social networks, they help like-minded people in business opportunities and company registration, for example, in the field of leisure and sports. The elderly unite and help young families with children; organize sports groups (Nord Working, etc.) and interest groups; elderly lawyers, doctors, teachers ... give consultations, including through the Internet. Neither elderly, nor mentors- students are grabbing money with a shovel, their goal is volunteering. They will do business, but they will also contribute to this social element.

*Do people of all ages need to learn social business and innovation?* The learning process undoubtedly increases motivation. Students feel that they are in an educational system that treats them with respect. And that they are invested in. It is good, if it continues after uni-

versity graduation. The same is true with older entrepreneurs. A person must understand that there are structures that care about him or her. In addition, it really improves the quality of social services and goods. When there is a spirit of creativity, it is always associated with learning.

Quality in higher education is a multidimensional concept. To attain and sustain national, regional or international quality, certain components are particularly relevant. Notably, careful selection of staff and continuous staff development, in particular through the promotion of appropriate programmes for academic staff development, including teaching/learning methodology and mobility between countries, between higher education institutions, and between higher education institutions and the world of work, as well as student mobility within and between countries. The new information technologies are an important tool in this process, owing to their impact on the acquisition of knowledge and know-how [20,21]. Today, many successful examples prove that Krasnoyarsk State Pedagogical University has an important role in the enhancement of the region.

## CONCLUSION

Krasnoyarsk State Pedagogical University really stands on the route to the social entrepreneurship development and influx of new technologies, introduction of innovative approaches and becomes the center of social and project competencies of the Krasnoyarsk Territory, one of the leading drivers of social development and of social assistance of the region.

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# EMOTIONAL INTELLIGENCE IN HEALTHCARE

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## ABSTRACT

**Background:** Healthcare professionals have new challenges to deal with.

**Aim of the study:** To reveal whether emotional intelligence could help healthcare professionals meet these new challenges.

**Material and methods:** Literature review.

**Results:** Emotional intelligence is seen as a valid strategy that can produce visible results.

**Conclusions:** It has been shown that emotional competencies can be effectively developed. Healthcare professionals must take advantage of this to become more effective and successful in their professional growth.

**KEYWORDS:** emotional intelligence, emotional competence, healthcare professionals, professional challenges

## CONTEMPORARY HEALTHCARE CHALLENGES

It has been argued that nowadays “more than prescriptions, medicine involves communication, tolerance, flexibility, listening, hard work, and a passion for the practice” [1]. Contemporary healthcare challenges are receiving increased focus and discussion. The main issues that healthcare professionals need to deal with include:

- Dynamic factors in contemporary health environments challenge traditional roles of healthcare professionals. Perceptions of their roles are influenced by societal attitudes, governmental policies, and trends in the profession;
- Patient education exhibits a lack of resources, educational tools, and sufficient time, inadequate knowledge and skills of healthcare professionals, and a lack of patient readiness, both physically and psychologically;
- Healthcare professionals must attend to varying levels of health literacy in patients and families when leading and advocating for global health competencies;
- Social inequalities, social and cultural minorities;
- Challenges in communication including the exchange of information, building of a relationship, and engaging in shared decisions;
- Challenges of limited time and resources, and multiple documentation requirements;
- Challenges regarding the difficulty of transferring available knowledge for clinical practice;
- Challenges of continuing skill development and improvement, and occupational professionalism.

Personal (and organizational) emotional intelligence could be a tool to overcome these challenges. Traditionally emotional intelligence is generally said to include emotional awareness, self-regulation, (self)motivation, empathy, and social skills.

## HOW COULD EMOTIONAL INTELLIGENCE HELP HEALTHCARE PROFESSIONALS WITH THE ABOVE CHALLENGES?

Emotional awareness is the ability to harness emotions and apply them to tasks like thinking and problem-solving. Self-regulation is the ability to manage one’s emotions, which includes cheering up or calming down other people. In healthcare, decisions made under the influence of emotions can greatly affect patient safety, outcomes, and the quality of healthcare. However, when individuals recognize their emotions, they are better able to regulate and use them. Self-awareness allows individuals to remove personal perceptions from the decision-making process, and provide unbiased care based on what’s best for the patient. It was found that the ability to regulate one’s emotions enables individuals to maintain a more positive affect (e.g., excitement and enthusiasm) while emotion facilitation ability enables people to use their positive affect to enhance their creativity [2].

People with a high degree of emotional intelligence are usually motivated. They’re willing to defer immediate results for long-term success. They’re highly productive, love challenges, and are very effective in whatever

they do. Emotional intelligence has been widely cited as an attribute which can improve the quality of work and increase productivity and personal and organizational success. The emphasis is on predicting academic, self-development or work-related outcomes [3,4]. On the other hand, low emotional intelligence correlates with deviant behavior, drug taking, alcohol abuse and poor relationships [5,6]. In more general settings emotional intelligence has been associated with life satisfaction [7–9].

Self-motivation helps in dealing with burnout. Stress and burnout among physicians and nurses have become very prevalent. Surveys show that burnout rate and stress among healthcare providers including doctors and nurses is higher than ever. In addition, burnout and job satisfaction are also relevant for patient safety, outcomes, and healthcare quality. A growing consensus exists on the impact that emotional intelligence has on job satisfaction, stress levels, burnout and the facilitation of a positive environment [10]. Additionally, the relationship between emotional intelligence, burnout and job satisfaction does not differ across gender, age, and tenure, meaning that regardless of whether an employee is male or female, young or old, of short or long tenure, they equally benefit from emotional intelligence. The moderator effect of job level is only significant for self-reported emotional intelligence, i.e., job satisfaction, and this relationship is stronger in non-managerial jobs than in managerial jobs [11]. It is worth noting that leaders' emotional intelligence is positively related to subordinates' job satisfaction too [12].

People with empathy are good at recognizing the feelings of others, even when those feelings may not be obvious. As a result, empathetic people are usually excellent at managing relationships, listening, and relating to others. They avoid stereotyping and judging too quickly, and live their lives in a very open, honest way. Many health care systems around the world are emphasizing a need for more patient-centered care [13,14]. Emotional intelligence can significantly influence patient outcomes and overall success for the organization. By being empathetic, improving interactions and relationships with patients, medical professionals and administration can better implement the principles of the patient-centeredness. And the impact of emotional intelligence in staff on patient health care outcomes has been recently highlighted [15].

Social skills. Healthcare providers and patient/family/caregiver relationships are sensitive, highly complex emotional relationships that require reliable and accountable system design methodologies that bridge the gap in communications that are profoundly

informed by our emotional intellect. However, most complaints about doctors relate to poor communication, not clinical competence, and improving communication in health care is therefore a current area of interest in policy and practice [16]. Emotional intelligence allows one to listen and therefore communicate effectively, motivate better, rectify errors, and increase productivity. In the healthcare field this is paramount. Studies say that "effective communication is 7% the words we say and 93% our tone and body language... Failing to communicate effectively in a workplace leads to frustration, bitterness, and confusion among employees." On the other hand, excellent medical communication increases trust among colleagues. It is argued that the advantages of effective communication cannot be emphasized enough [17] and excellent communication is the expectation of patients [18].

## DEVELOPING PERSONAL EMOTIONAL INTELLIGENCE

Explaining emotional intelligence is challenging enough, without describing emotional competencies. Developing personal emotional intelligence is challenging as well. But over the past two decades, emotion-related individual differences have been conceptualized as knowledge, abilities and traits, i.e., competencies [19]. There are five core emotional competencies, and each is distinct for one's own and others' emotions: identification, understanding, expression, regulation and use of one's own emotions and those of others. It thus provides 10 competencies of emotional intelligence: identification of one's own emotions, identification of others' emotions, understanding of one's own emotions, understanding of others' emotions, expression of one's own emotions, listening to others' emotions, regulation of one's own emotions, regulation of others' emotions, use of one's own emotions, and use of others' emotions [20]. There are proofs that these competencies can be effectively developed [21].

## CONCLUSION

Since contemporary healthcare has new challenges, new strategies are needed to cope with them. Emotional intelligence is a valid strategy and can address some of those challenges well. Whereas it has been shown that emotional competencies can be effectively developed in every human being, this gives hope that every healthcare professional who wishes to become more effective and successful in their own professional growth.

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# DIGITAL TECHNOLOGIES FOR ART THERAPY PRACTICES USED IN HEALTHCARE

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## ABSTRACT

The use of digital technologies influences practically almost all aspects of our daily life. In the field of healthcare, in particular, technology plays a very important role in activities related to data collection, data storing, and data analysis. The aim of technology in healthcare is to provide a range of healthcare professionals with access to information that will help increase the cost-effectiveness of care delivery and improve the efficacy of care.

Psychology counseling is an area where specific elements, such as evaluation of emotional health, could be supported by the use of appropriate technologies. Such technology could increase accessibility to this type of assistance by reducing lengthy and costly travel to specialized centers. In addition, technology may enable overburdened professionals to increase the reach of their services, and help people with physical limitations who have restricted ability to travel to receive care.

So-called 'virtual assistants' (also known as 'chatbots') could help patients to identify emotional imbalance. In general, the evaluation process could include a series of questions that aim to find the emotional problem, and ultimately to propose a suitable program of art therapy.

The current study aims to outline the steps needed to develop a chatbot that is capable of identifying emotional imbalance and selecting a suitable program of art therapy. We also consider the addition of virtual and augmented reality as a further possibility for improving the therapeutic process.

**KEYWORDS:** digital technologies, digital healthcare, chatbot, art therapy practices, human-computer interaction

## DIGITAL TECHNOLOGIES IN HEALTHCARE

Advances in digital (i.e., information) technologies give pace to the rapid development of variety methods and tools that can be used in practically all areas of our daily life. As these technologies continue to evolve, numerous investigators have explored the challenges, barriers, and opportunities associated with the use of information in healthcare. Broadly defined, digital health refers to the use of digital information, data, and communication technologies to collect, share, and analyze health information with the aim of improving patient health and health care delivery [1].

One beneficial application of technologies in healthcare is their use as a diagnostic tool. The rapid growth in computing power has enabled the development of machine-learning algorithms that are used in variety complex data evaluations. These algorithms arise from the development of artificial neural networks in attempt to simulate the human brain's neuronal response to external stimuli and thus facilitate learning and pattern

recognition. There are numerous examples showing the utility of neural networks for detecting different diseases, including diabetic retinopathy [2] and lymph node metastases after the diagnosis of breast cancer [3,4].

The same or similar technologies could be also used in other areas such as psychology, and more specifically, in the sub-field of art therapy. Growing evidence suggest that art therapists utilize digital media for personal and professional use, and increasingly for therapy [5]. Art therapists using digital media maintain ongoing digital culture membership through their interest, upgrade, and continued use of digital media tools for creative and clinical work.

## ART THERAPY AND DIGITAL TECHNOLOGIES

Art therapy can be defined as a natural and spontaneous expression, which helps to develop both inter- and intrapersonal communication. Artistic expression is a way to assess the feelings and perceptions of the

person's inner world, and to facilitate communication between this inner world and the outer world. In this way, art therapy could be used to resolve a variety of emotional problems. Therapeutic digital media provided to persons in need may include various creative 'apps' for art making such as video, animation, digital drawing, collage, photography, and augmented reality. In addition to these expressive digital techniques, another opportunity is developing the digital equivalent of dialog with the art therapist. This digital dialog aims to identify emotional problems and find a suitable art practice that will help to overcome the imbalances.

Human-computer interaction is currently an area of high importance, and a key to understanding it is an appreciation of the fact that interactive interfaces mediate the redistribution of cognitive tasks between humans and machines. In fact, the interaction between humans and machines is a perfect example of the implementation of state-of-the-art consumer-oriented artificial intelligence (AI). Such interactions simulate human behavior based on formal models, and represent an interesting subject for research on patterns of human interaction as well as issues related to assigning social roles to others, finding patterns of successful and unsuccessful interactions, and establishing social relationships and bonds.

### ART IN HEALTHCARE

"Little as we know about the way in which we are affected by form, by color, and light, we do know this: that they have an actual physical effect. Variety of form and brilliancy of color in the objects presented to patients, are actual means of recovery." Florence Nightingale 1860

"Research shows art is far more than aesthetic beauty made for entertainment. It supports health by its ability to reduce stress, decrease the duration of treatment, lowers blood pressure, accelerates healing, heightens mood, and initiates the joy response. Patients, visitors, staff, health experts, and scientific researchers unanimously agree that art in hospitals improves care, raises outlook, and is enjoyable, lifting and positive for everyone. Patients, especially those anxious about undergoing procedures and tests, respond well to the visual stimulation, finding it reduces their stress." [6]

### WHAT SORT OF THING DOES ART IN HEALTH INVOLVE?

There are, broadly, five main areas of arts in healthcare work:

1. Arts in healthcare environments: Nowadays, many hospitals have artists working to improve gardens and clinical areas.
2. Participatory arts programs: Getting involved in the arts provides both social and creative out-

lets for people who are ill – either with physical or mental health issues.

3. Medical training and Medical Humanities: For hundreds of years, the arts have played a part in developing the practice of medicine, and in our understanding of wellbeing. The arts are also often used to help explore ethical issues in medicine.
4. Art Therapy: the art therapies (drama, music and visual art) have now become an established psychotherapeutic tool for used by qualified therapists with clients, usually on a one-on-one basis.
5. Arts on Prescription: Arts on Prescription schemes provide arts and creative activities for participants, usually for people experiencing mental health problems and social isolation. The purpose of such schemes is not to replace conventional therapies but rather to act as an adjunct, helping people in their recovery through creativity and increasing social engagement [7].

Art in hospitals is generally viewed positively by both patients and staff. A qualitative evaluation of the Exeter Healthcare Arts Project found that the display of visual arts in the hospital was perceived by patients, staff, and visitors to have a positive effect on morale [8]. Forty-three percent of frontline clinical staff believed that the arts had a positive effect on healing, and 24% indicated that the arts improved clinical outcomes. Other studies have assessed the importance of patient choice. A volunteer program in Canada allowed long-term hospital patients to choose from a selection the piece of art that they would like displayed in their room. Patients reported that the added element of choice improved their mood. There is, moreover, considerable evidence that mental health can be improved by participation in arts projects [8].

### EMOTIONAL INTELLIGENCE, AI, AND CHATBOTS

The promise of AI in healthcare is to provide a set of tools to augment and extend the effectiveness of the therapists in practically all fields. The introduction of data-rich technologies to the clinic will require specialists to interpret and operationalize information from many (bio)medical sources. Thus, it is expected that decisions - particularly those made in urgent situations - could be more efficient, more effective, and personalized when they are supported by reliable digital technology. While AI is needed to support the processes leading to an ultimate medical decision, there are other possibilities that will bridge the gaps in healthcare. For example, AI can assist customers with booking appointments and can assist doctors by operating like pseudo nurses [9-11].

Over the past few years, virtual help agents - also known as 'chatbots' (software program that interacts with users using natural language) - have taken on sur-

prisingly sensitive jobs in modern society by offering help, support, and companionship. As chatbots gather mood data and any texts or emojis that a patient might enter, the chatbot traces the branches of a decision tree to offer personal responses. In general, the chatbot asks questions like as “What is your energy like today?”, “How are you feeling?”, or “What’s going on in your world right now?” Those prompts are modelled on today’s most popular form of talk therapy, cognitive behavioral therapy (CBT), which instructs individuals in how to recast their negative thoughts in a more objective light. Users are encouraged to talk about their emotional responses to life events, and then stop to identify the psychological traps that cause their stress, anxiety, and/or depression.

A chatbot may also be useful for providing advice on an appropriate art therapy practice. In the counselling process, the therapist may ask specific questions to evaluate the emotional balance of the user. By analyzing the dialogues that occurred during therapy sessions, a specific order of question could be constructed to identify the type of emotional imbalance. Then, it is possible to offer a suitable practice that will influence the needed emotion. If the question sequence is known, it can be technically structured in a simple *If-Then-Else* logic. Currently there are numerous open source and paid decisions for construction of such logic as interaction with chatbots.

#### METHODOLOGY AND EXPERIMENTAL DESIGN OF CHATBOT FOR ART THERAPY

Depending on type of technology that is used, the chatbot could interact by text messaging, voice, or combination of these modalities. In current work, the interaction process is based on text messages and visual elements. Because it is based on logical flow of information a structured type is used including menus, buttons, choices, and forms that need to be filled. To evaluate emotional balance, a sequence of questions adapted from the standardized Toronto Alexithymia Scale (TAS) [12]. The TAS is a 20-item instrument that is one of the most commonly used measures of alexithymia. Alexithymia is a condition associated with difficulty in identifying and describing emotions, and individuals with alexithymia tend to minimize emotional experience and focus attention externally. The questions from the original TAS have been modified slightly, to add a personal engagement to the respondent – e.g. “I am often confused about what emotion I am feeling” is now “Are you often confused about what emotion you are feeling”. The part of the conversation flow is schematically presented in fig. 1.

Following the question sequence, the user should give answers to twenty questions. As a result of scoring of the answers it will become clear if there are any potential problems with identification of emotions.

Another test that can be used is the *Strengths and Difficulties Questionnaire* (SDQ) [13]. If any problem-

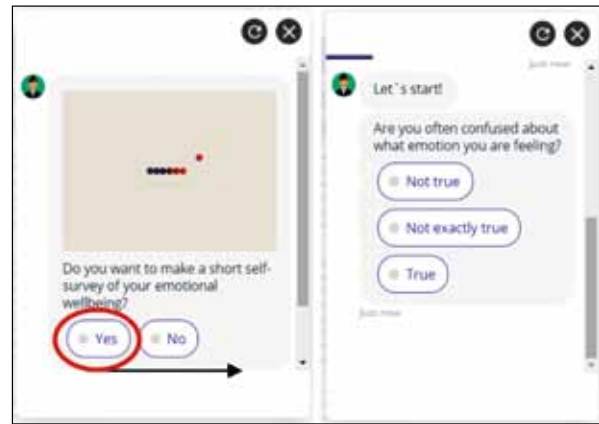


Figure 1. Representation of dialog with the chatbot.

atic score is achieved, the user can be advised to use a suitable art therapy practice – e.g. “*draw yourself as a super hero*”.

#### POSSIBILITY OF USING VIRTUAL REALITY IN ART PRACTICES

In its simplest sense, virtual reality (VR) describes a three-dimensional, computer-generated, interactive environment that can be explored by an individual user [14]. The user essentially becomes part of the virtual world and is immersed within the VR environment with the ability to manipulate it in various ways or perform actions within it.

A range of mental health professionals are currently using VR as a part of various treatments. According to these professionals, an advantage of VR is that individuals know that it is not real, but their bodies and minds respond as if it is. In other words, people can much more easily encounter difficult situations and interactions through VR than through the real world, and they have a greater ability to try out new responses and behaviors.

From practical point of view, in some cases the art therapy practice could be extended by making use of VR models. For example, the art therapy practice “*draw yourself as a super hero*” could be transferred into a VR environment and could be seen in quite different way. Visualization of such a scene is represented in fig. 2, taken from the Google Poly website.

#### CONCLUSIONS AND PROSPECTIVE RESEARCH

Digital health technologies have significant potential to revolutionize healthcare delivery, transform clinical trials, and improve health outcomes. In the field of psychology counselling, the use of virtual assistants (known also as chatbots) is expected to become more valuable for use in both diagnostic and therapeutic activities. Chatbots are expected to be easily constructed and applied in practically all forms of evaluations related to emotions and overall wellbeing. As a

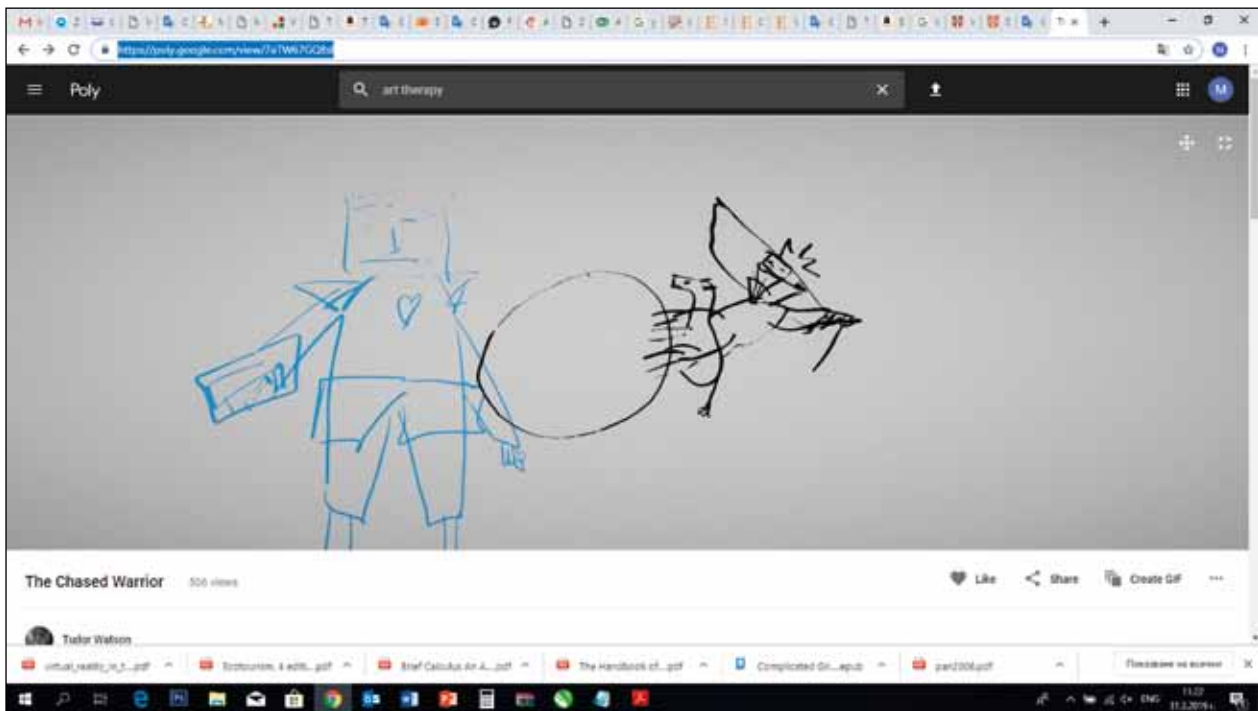


Figure 2. Representative image of scene that can be used in VR art practice. Image from <https://poly.google.com/view/7aTW67GQ8sl>.

result, the most appropriate art practice can be selected and applied to recover an emotional balance.

As a further step in the process of art therapy, VR is considered to be a natural extension of the art

practices. A challenge in applying these technologies to art therapy will be in finding the most appropriate combination that yields the best therapeutic outcomes.

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# SELECTED MODELS AND THE CLASSIFICATION OF HEALTH CARE SYSTEMS

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## ABSTRACT

Health care is a fundamental element of each country's social policy. It is mainly organised and implemented through the adoption of a certain political framework (defined objectives and priorities), strategic and operational management (planning, organising, motivating and controlling), and generation of resources (e.g. defined activities of collection and distribution of financial resources, training of medical professionals, and the purchase of technology and pharmaceuticals). These principles are either formulated on the basis of already functioning health care models or bespoke models are being created. An important element of a given model is to define its mission (the reasons for its creation and operation), while such elements as the functions, objectives, resources and methods of operation attribute to its individual properties and values.

Health care systems may be organised differently. Their main distinguishing features are the ownership (public, private or mixed), sources of financing (public, private or mixed) and management (centralised, dispersed), or they can be structured with regard to political aspects (single-centric, multi-centric and pluralistic).

This article, based on the latest scientific developments, presents the historical outline of the selected models for health care systems and the new concepts regarding their classification. The article also offers theoretical analyses of those health systems, which have become the models for others.

The aim of this article is to present the classification and the characteristics of the selected models for health care systems, both from the historical perspective and the perspective of those currently in operation. The documents analysis method was used, which included the leading positions in the Polish and foreign literature, in the field of the issues addressed, as well as the literature published by the related institutions.

This topic is already being discussed within the literature of the subject, nevertheless it is still relevant and, due to its undeniable importance, deserves further examination because it directly or indirectly concerns every human being.

**KEYWORDS:** classification, model, health care system

## BACKGROUND

Classification, in the view of comparative research, is an integral part of science. It allows us to identify both similarities and differences between individual variants that belong to the same category. Health care systems are subject to similar principles and can be classified according to a number of criteria, indicative of the public policies of the countries in which they operate. Furthermore, they can be organised with proportions of government and private funding, and public and private ownership, based on the method of their management or considering political aspects [1].

The adopted solutions and the correlations between these elements allow for the description of a model (a simplified presentation of the basic features or mutual relations [2]), according to which health care operates

in a given country. Meanwhile, defining the characteristic attributes of the model already in operation, together with their description, enables identification, designation, and future evaluation.

In the theory of management, a systemic approach has been distinguished whereby a system is defined as a set of interconnected and interdependent parts [3]. Effective solutions to health care challenges are implemented in a systemic way, due to the complexity of the matter and the necessity for the cooperation of many correlated (interconnected) elements, all of which serve a specific function. Therefore, we refer to them as the models for health care systems.

Classifying the models for health care systems (clustering them due to their similarity to those considered exemplary) allows to understand how a model func-

tions. A starting point for analysing and evaluating the existing health care systems throughout the world is identifying the typical models for health care systems, whose characteristics have been clearly established [4]. Once these health care models have been identified, it is then possible to assess their effectiveness (how they achieve the intended objective) and efficiency (the relation of the benefits achieved to the costs incurred).

Every day, people's lives depend on the efficient operation and management of health care systems. We can observe that health care systems in different countries, although assigned to the same model, are operated in a different manner and there are discrepancies in the way they are managed. Ultimately, such a situation has an effect on the quality, value and life expectancy of the society they are intended to serve [5].

## SELECTED TYPOLOGIES OF HEALTH CARE SYSTEM MODELS

### Conventional classification of health care system models

A commonly used classification refers to historical aspects, where the main distinguishing feature of the models is the method of subsidising funds, which according to Lewandowski [6], is related to the position of the authorities and their views on the health of the citizens. In the historical perspective, the following models of health care systems were adopted: the insurance model (German, Bismarck); the socialist model (Soviet, Siemaszko); the national model (British, Beveridge); and the market model (residual, American) [7].

The first obligatory insurance premium, in the form of a disability insurance for workers, was introduced in 1883 in Germany, and its assumptions laid the foundation for the creation of an insurance model. The insurance model was based on a commonly paid (by both the employer and the employee) and obligatory paid (resulting from the provisions of law) health insurance premium. The authorities' concerns for the health of their citizens were not the prerequisites for introducing a systemic model of health care, yet this model became the first traditional model of health care system. With the introduction of the insurance model by means of legal regulations, the existence of financial institutions in health care was normalised, related to the collection of insurance premiums and the financing of medical services. This was also the first time that the amount and the frequency of a premiums payment scheme were regulated by law [8].

Based on the experiences of Germany, the same health care model was introduced in France, Belgium, Austria, the Netherlands and Japan, and in the inter-war period also in Poland.

After the October Revolution in 1917, the establishment of the communist state began in Russia. After the communist statehood was strengthened, a new model

of health care was introduced – the socialist model, also known as the Siemaszko model. This model functioned on the basis of the country's five-year development plans. The state assumed full control of the health care system, and the organisation and financing were centralised. Under the doctrine of the socialist state, the government structured and financed health care, and assumed full responsibility for the functioning of the health care system and the health of its citizens, who were entitled to full access to such services [9].

After the Second World War, the socialist model was adopted by the so-called countries of people's democracy: the Czech Republic, Lithuania, Hungary, as well as Poland and China. However, it can be noted that not all the principles of the socialist model were implemented in these countries. In Poland, the Act on the Medical Profession of 1950 [10] allowed the doctors, whose primary place of work was a social institution, to pursue their profession outside the national health care facility. Direct payments could be made by patients for the medical services rendered in private practice, and in this way, private health care was allowed, to a limited extent and under the full control, to operate alongside the national health care system.

During the Second World War, there was a conviction formed that the health of citizens is a public good, and the state should foster and protect it. On the basis of these beliefs, the UK government introduced a system of national health services with the intention of providing 'social security' for the population and to protect it 'from cradle to grave'. The introduction of the National Health Service (NHS) was driven by the views of Sir William Beveridge, presented in the so-called 'Beveridge report' of 1946 on, among others, unification of the pension and social security plans [11]. The national model predicted that the state would take full responsibility for the health of all citizens and provide them with free access to medical services. Characteristic features of the national model are its universality (all citizens are entitled to benefits, regardless of their social status) and free access to health care. The British model implements the principle of social solidarity (assistance in providing benefits to persons in need through a fund developed by the joint efforts of insured persons) [12]. However, in the assumptions of the national model, the rejection of private health care and private financing from other sources, e.g. voluntary private insurance, was not included.

The national model of health care, following the example of the United Kingdom, was introduced in Denmark, Finland, Sweden, Greece, Spain and Canada.

The final example of traditional classification models for health care systems is the residual model. This is mainly based on a rejection of the caring role of the state and thus access to medical services for its citizens. In this model, the health care sector is a market, where demand and supply play a major role and the patient is treated as a customer who can freely choose to purchase the medical services offered. The availability of

such medical services depends on the patient's financial resources and are financed through individual payments for the services provided or through individual insurance premiums [6].

Originally, the USA adhered to only the residual model; however, over the years the intervention of the state in the US health care sector has increased. Currently, some areas of health care are financed from public funds (for people in special situations, e.g. the elderly or the poor). [13]. As a result, the residual model in its original assumptions currently does not exist.

### **Classification of health care system models in a political context**

In the literature on the subject, a typology of health care models can be noted whose decisive feature is the organisation of the decision-making process. This includes a political aspect. Here there is a distinction between single-centric, multi-centric and pluralistic models [14].

The single-centric model of health care is characteristic of a government that strives for a maximally centralised system, where the competent authority has exclusive rights in the decision-making process. The model is managed centrally, through the hierarchically structured units performing the assigned tasks. Everything is decided by the authority that fully controls the system. In a single-centric system, the participation of private entities is acceptable, however, they are treated objectively and instrumentally. In contrast, in a multi-centric model, the fundamental principle is to create a system based on the market mechanisms, where the regulating factors are supply, demand and competition. This model has many participants – patients, providers and payers – who act independently and make their own decisions. The role of the authority is limited and only has an indirect impact on the operation of the model, e.g. the creation of its general and legal framework.

The features of both single-centric and multi-centric models can be found in the pluralistic model. Decision-making in this model is shifted to a lower level of government and those in need, while the role of central government is to create a general and legal framework, and to monitor and encourage participants in the system to cooperate with one another. The operation of the pluralistic model is carried out by means of negotiations and contracts between participants in the health care system. A number of different stakeholders are involved in the functioning of the system and different forms of management are applied, as described in an article by Ahmed et al. [15].

Solutions characteristic of the single-centric model can be found in France and the UK, where health care systems are centralised. The single-centric model is attributed to national health systems, while the characteristic features of the multi-centric model can be found in the American health care system, where pri-

vate ownership is firmly rooted. Features of the pluralistic model can be observed in the current German or Canadian health care system, as well as in many low-income countries such as Bangladesh and Cambodia.

### **Classification of health care system models based on the elements of the system**

Romer was one of the first to propose the concept of classifying health care systems based on the elements of the system (as in the systemic approach).

His earlier concept, referred to in the literature as 'Romer's First Concept', stated that health care models consisted of seven subsystems – source of financing, human resources, material resources, provision of services, preventive services, regulation, and administration – all of which perform specific functions [16].

'Romer's Second Concept' lists five basic elements: management, resources, way of providing services, economic (sources of financing and programmes) and the institutional form responsible for organising the system [14]. We can note that this later concept details an element – resources – which received a broader context, including human and material assets.

Another approach classifying health care systems based on its elements was proposed by Zweifel. Zweifel listed patients and medical service providers (doctors) as the basic elements of the health care system, however, he considered that the nature of a system is determined by realisations between these elements. In a doctor–patient relationship, the ability to control the patient comes down only to the choice of financial function, which provides the doctor with an appropriate stimulus. Optimal payment schemes for the doctors' services may be considered socially unacceptable, and the patient may not recognise such a scheme, which may affect the quality of the service received. Therefore, Zweifel proposed 'complementary entities', which characterise the system and include financing and finance-shaping mechanisms. He indicated five groups of complementary entities that may be important in the health care systems: medical associations, employers, private health insurers, social health insurers, and local and central governments. Moreover, the selection of a dominant complementary entity, which eliminates conflicts in the doctor–patient relationship, is a characteristic feature of a given health care system. One example of this is Germany, where medical associations function in a very similar way to complementary entities, through their participation in the doctor–patient relationship and determining the ways of financing medical services [17].

*The individual elements of the system can be considered as subsystems of a larger structure. In this case, the subsystems are separated and considered autonomous elements functioning in the environment, which is a broader system itself.*

The analysis of the models for health care systems, based on the concept of multi-level organisations, was

proposed by Strumberg. In his concept, Strumberg presented a system consisting of the elements defined as separately functioning systems that interact with one another, and have consistent values, objectives and rules within the whole health care system. Furthermore, he indicated the functioning of those subsystems on four levels: macro level (policy and management at the national level); meso level (health care management at the regional level); micro level (provides local individual health care services); and nano level (personal health issues and independent management of personal well-being and diseases) [18].

The presentation of a health care model as a multi-level organisation (system) with many subsystems (elements of the system) is consistent with the theory of the systems and their complexity.

### **Multidimensional classification of health care system models**

The economic changes and the tasks faced by the authorities resulted in an increase in the demand for financial resources. These stemmed, among other things, from the fact that the population was ageing, as well as from the subsequent technical progress that enhanced therapeutic possibilities. These motivations led to an intensified interest in the organisation of health care [6]. As a result, the concept of multidimensional classification of the models, proposed by the Organisation for Economic Cooperation and Development (OECD), which considered the method of their financing (fundraising and their transfer), was established [14].

The OECD proposed a new classification, where the simplest model was that of direct fees paid by the consumer. It has also identified the models of voluntary and compulsory insurance, allowing for the reimbursement of all or part of the expenses incurred. In the first situation, a patient makes informed decisions, chooses the insurer, concludes a contractual agreement and pays a premium. They decide on the choice of a provider and make a direct payment for the services obtained. The patient's contract with the insurer is the basis for claiming reimbursement of some or all of the costs incurred. With compulsory insurance, a patient is no longer free to choose an insurer, which is regulated by law.

A slightly different OECD proposal was voluntary and compulsory insurance models based on contracts between insurers and medical service providers. In a voluntary contract-based insurance model, a patient is free to choose an insurer, which then concludes contracts with health service providers on the patient's behalf. The role of the patient is limited to paying a premium, while the insurer pays for medical services. In a contract-based compulsory insurance model, the patient is not free to choose the insurer and is obliged to pay an insurance premium. However, all medical services are paid by the insurer.

Finally, the OECD classified an integrated system for the models of voluntary and compulsory insurance, which differ in terms of the approach to insurance design. Here the model of voluntary insurance is characterised by unconstrained affiliation. The patient chooses an insurance institution and the insurer organises medical services as part of its own, self-organised medical services. However, in the model of compulsory insurance in this integrated system, the autonomous choice of insurer is limited. A patient cannot be uninsured and, while using the medical services provided, cannot benefit from services outside the system, which is organised by the institution that collects the funds [19].

In 2006, Wendt et al. presented the concept for the classifying health care models as a combination of three determinants – financing, provision of health services, and management – considering the impact of the state, society or market forces on their implementation. The authors proposed 27 combinations ( $3 \times 3 \times 3$ ) of theoretical types of health care system, and from these they identified three ideal systems whose characteristics in all three determinants are implemented in the same manner. In the ideal public health care system, the financing, provision of services and management would be undertaken by public entities and institutions. In the ideal social health care system, social entities (non-governmental) would take responsibility for financing health care, its provision and management. The ideal private health care system would be where all three dimensions are under the patronage of market entities. In addition to each ideal type category, there were combinations of mixed types, in which the identification takes place through the manner in which their characteristics are realised. The authors also indicated types of models where each of the features is realised in a different way, referring to these as purely mixed types [20].

Freeman proposed his own concept for the division of health systems. He described health care systems according to several dimensions: health care provision (doctor, manager and patient); medical finance (salaries and fees, taxes and premiums); and regulations (markets, hierarchies and networks) [21]. He pointed to many variables that affect the diversity of the models in different countries. Health care can be provided, financed and regulated (or governed) in different ways, in hospitals or in private practice. He drew attention to the different ways in which doctors are remunerated, to the forms of ownership and activities of therapists, and to the way health care is paid for. According to Freeman, health care can be paid for either through general taxation or both public and private insurance schemes. Financing and provision of health care can be administered centrally, regionally or locally. He identified national health systems as a combination of ways to achieve these dimensions. Further, he proposed a three-dimensional classification according to



the typical models, defined as national health services and social security systems.

Böhma et al. classified 30 different health care systems based on the OECD countries, and proposed 10 models of health care systems. The proposed typology distinguishes three basic dimensions of the health care system (regulation, financing and provision of services) and three types of entities (public, social and private). They concluded that there is a hierarchical relationship between those three dimensions (regulation, financing, provision of services), where the overarching dimension limits the nature of the subordinate ones [22].

Toth proposed the adoption of a classification of health care models, considering the mechanisms of financing and provision of health care services, and in particular the relationship between health care providers and insurers [23].

### Classification of health care system models based on the functions of the system

The World Health Organization (WHO) has proposed a classification of health care models based on the functions of the system to achieve certain objectives.

WHO provided indicators of the performance of national health care systems in relation to three general objectives: good health of the consumer society in the model; responsiveness to the expectations of the population; and fairness of funding. Considering the first objective, it was pointed out that a well-functioning health system primarily contributes to the good health of society and at the same time reduces the inequalities and improves the health of the less fortunate. According to WHO, the ability to respond to the expectations of the population comes from having

the capacity to address the demands of people in relation not only to health, but also to other issues, such as education. Moreover, the system should be focused on those in need. The third objective of financial fairness acknowledges that health care can be expensive, therefore it is important to protect people from choosing between deprivation and loss of health. WHO also pointed out that the mechanisms for mitigation and risk-sharing, in order to provide financial protection, are more important than in other cases such as home insurance, motor insurance, etc. [24].

WHO set target categories as qualifiers for the formulation of a health care model fulfilling four basic functions and recommendations for each of these functions: service delivery; generation of financial resources; management; and investment in human and sustainable resources.

Hołówka proposed group health care models on the basis of four normative requirements for health care, adding that these are 'not feasible models'. The author distinguished four theoretical models: moral, bureaucratic, free-market and insurance, assigning ownership to each of them [25]. These models are shown in tab. 1.

Kumakawa presented an integrated health care system, targeted at the elderly community, as the third type of system (the world's highest number of 100-year-olds live in Japan). The health system consists of five elements: three specialist medical services (prevention, treatment and nursing care) and two non-specialised services (home care and social welfare support) [26].

Efforts are also being made to design future health models based on the achievements of the science of management. Kraft and the co-authors presented the health care model as an organisation capable of con-

Table 1. Health care system models according to Hołówka.

Feature of the model	Moral	Bureaucratic	Free-market	Insurance
Foundation of its operation	life and health are the greatest good, health protection and saving lives is the highest obligation at all costs	science and scientific evidence, strictly described and defined objectives and procedures	free-market unrestricted supply and demand regulate the needs of the patient and their fulfilment in the field of health	rational behaviour, pluralism, respect for the diversity of the needs in the field of health
Supervision and responsibility	autonomy – a moral duty, the patient should receive the required and effective medical assistance, because the patient and medical personnel is a specific vocation	central administrative, responsibility of the administration	corporate institutions, the patient is responsible for their own health	insurer
Sanctions and infringements	public punishment, stigmatisation, moral criticism	in accordance with legal regulations, procedures and bylaws	is not the subject of an external evaluation, the limitation of financing, possible claims are considered by the court in accordance with legal regulations	evaluation of the participants of the model, protests
Access for patients	Universal – the economic factor is morally unacceptable	limited, resulting from legal orders, procedures and regulations	limited to funders only	limited to insured persons only

Source: author, based on Hołówka [25].



tinuous learning [27], proposing changes to be made at the organisation level in five areas: objectives and strategies, culture, people and processes, educational infrastructure and technology.

## SUMMARY

The presentation of the selected models of the health care systems, together with their systematisation, provides a view on classification as an important and inherent element of the comparative research and the comparative analysis of the health policies in various countries.

Through the analysis of a health model of a given country, we can find similar features and attributes that occur in a health care system of another. If an analogy is found, we can then group the health care systems of these countries into one recognised model, using the same method of their classification, while still recognising the differences between them.

Many classifications of health care systems are already in operation, yet distinct criteria have been used to establish the purpose of each of them. While there are slight differences between the listed types or benchmarks of each of the systems, through analysis of the relevant literature we can observe that the classifications presented are mainly based on three fundamental criteria: the recipient (patient), the pro-

vider (doctor), and financing (private, private and social insurance). This, in turn, determines the way medical services are provided and accessible for a patient. The above-mentioned criteria are the main factors differentiating the existing models for health care systems worldwide. Further classification concepts are a compilation of the basic criteria.

In all cases, the proper classification of a model of health care system and its assignment to a given type requires a solid analysis of its organisation and mechanisms of operation.

None of these classifications of health models is optimal (the best), as there are no ideal models for health care systems. The chosen classification is the most advantageous one considering the purpose it is supposed to serve, i.e. the reasons for its creation.

There have been dynamic economic, social and demographic changes leading to certain reforms in health care in a number of countries. Technological progress also enforces rapid changes in the health care system. Therefore, we can observe that efforts are being made in order to reform and adapt health care systems to modern requirements, together with simultaneous aims to increase efficiency (the best possible results in relation to the costs incurred). As a result, the subject of the classification of health care system models is and will remain relevant.

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# BUILDING BRIDGES BETWEEN BASIC SCIENCE AND CLINICAL MEDICINE: A LIBERAL ARTS PERSPECTIVE

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**A** – study design, **B** – data collection, **C** – statistical analysis, **D** – interpretation of data, **E** – manuscript preparation, **F** – literature review, **G** – sourcing of funding

## ABSTRACT

A critical issue for improving global health care is to better integrate basic science and clinical practice, as such integration will lead to innovative solutions. In this article, I will present models for how to prepare students to participate effectively on multidisciplinary teams that foster cooperation between scientists, medical centers, biotechnology businesses, and governmental bodies. I will provide examples of training programs in the United States (USA) designed to increase the number of and diversity of scientists and clinicians engaged in bridging basic science and clinical medicine, also called translational research. The training programs target different stages in career development, from pre-medical students through early career faculty, and have varied organizational structures. Many of the programs have existed long enough for institutions to be able to evaluate their effectiveness, and despite the different program contexts, there are key characteristics common to all of the programs that correlate with successful outcomes. Many of these characteristics can be adapted to other career stages and settings. I will summarize these and describe an example of an interdisciplinary, integrated science course for undergraduates that introduces students at the earliest stage of their careers to addressing complex problems through teamwork. Finally, I will provide suggestions for how other institutions can implement training programs that will build bridges between basic science and clinical medicine.

**KEYWORDS:** translational research, training programs, interdisciplinary collaboration

## BACKGROUND

Health care is a complex, multidisciplinary issue requiring innovation to improve patient outcomes while managing costs. My perspective is as a scientist and professor at a predominantly undergraduate liberal arts institution that sends many students to graduate and medical school. In the USA, the undergraduate years are a prime time for students to explore career options while gaining breadth and depth of academic learning. Therefore, it is important to make this population aware of opportunities to participate in finding innovative health care solutions, and to help prepare them to be effective contributors to interdisciplinary research teams.

## TRANSLATIONAL RESEARCH

The Evaluation Committee of the Association for Clinical Research Training (ACRT) set forth a definition of translational research that has been widely

accepted in the USA [1]. “Translational research fosters the multidirectional and multidisciplinary integration of basic research, patient-oriented research, and population-based research, with the long-term aim of improving the health of the public.” The ACRT committee also provided a framework for designing and evaluating programs that focus on translational research.

## WHY IS IT IMPORTANT TO IMPLEMENT PROGRAMS?

Institutions have developed programs to enhance translational research since they recognized that not enough scientists and clinicians were involved in such research, and that the institutions needed to foster their participation. Traditional training of scientists and clinicians does not include how to engage in translational research, and yet the skills necessary to develop successful translation researchers can be taught and

learned. Another reason to implement structured programs is that translational research requires interdisciplinary teams due to the wide range of skills needed to find innovative health care solutions (e.g. bioinformatics, high throughput approaches, legal, marketing, business plan development), and people in these different areas might not have easy ways to find each other and collaborate [2]. In the USA, there are significant disparities in access to healthcare and increasing the diversity of those involved in translational research is one way to address the problems. The biomedical challenges in search of solutions are multipronged, with societal and cultural factors essential components of any successful approach.

A further challenge to implementing novel approaches to health care is the gap between basic research and commercialization of a health care innovation. Knowledge necessary to bring a new product to patients, such as regulatory and intellectual property concerns, is outside of the scope of training in biomedical sciences; however, programs tailored to close this gap have been effective[3].

#### **EXAMPLES OF TRANSLATIONAL RESEARCH PROGRAMS IN THE UNITED STATES**

Universities and medical schools in the USA have developed programs to encourage health care innovation by bringing together teams with distinct areas of expertise. Some of the programs have a goal to increase the numbers and diversity of scientists and clinicians engaged in innovative translational research, while others focus more on bringing new solutions to the health care marketplace. One of the many advantages of putting a structured program in place is that institutions can evaluate them and determine what components work and what should change.

The National Institutes of Health (NIH) also has translational research as a priority and supports the NIH Clinical and Translational Science Awards (CTSA), run by a section of the NIH called the National Center for Advancing Translational Studies (<https://ncats.nih.gov/ctsa/about>) for institutions, and the Clinical Research Education and Career Development (CRECD) Program (R25) for individual researchers. Currently, the NIH funds 58 translational research “hubs” through the CTSA mechanism (<https://ncats.nih.gov/ctsa/about/hubs>). Institutions employ the funding in different ways (see [4], [5], [6] for examples). A hub at the University of Texas Medical Branch developed a multidisciplinary translational team (MTT) model for training translational researchers [4]. Their multi-faceted program recruits participants at different career stages, including graduate and health science students, early career investigators, and senior investigators from different departments, and does not focus on one specific area of translational research. Team science is a critical component of translational research and they create

structured teams that deliberately include a variety of viewpoints and career stages, and then provide ongoing training for how to work productively on a team. Their program also includes support and training for research mentors, recognizing the benefits of complementary mentoring models for trainees.

Increasing the diversity of participants in translational research is an explicit goal of a number of programs, including the CSTA-supported consortium of Emory University, Morehouse School of Medicine, and Georgia Institute of Technology in Atlanta, Georgia that focuses on training junior faculty through a two-year Master of Science in Clinical Research (MSCR) program [5]. The funding made it possible to give junior faculty time to develop an independent translational research program while advancing their careers [5]. The CRECD program supports a consortium of The University of Puerto Rico-Medical Sciences Campus (UPR-MS), a Hispanic public, academic health center, and Morehouse School of Medicine (MSM), a historically black private medical school, which emphasizes the recruitment and training of a diverse group of trainees through a post-doctoral Master of Science in Clinical and Translational Research (MSc) program [6]. These are two examples of programs that implemented master’s level training to provide coursework and structure for trainees.

Institutions have continued to design programs distinct from the CTSA and CRECD awards to advance technology and innovation in health care. Yale University established the Yale Center for Biomedical Innovation in 2014 to address the gap between basic research and commercialization of health care solutions [3]. They drew on the experiences of other such Health care Innovation Centers (HIC), including a partnership between Massachusetts Institute of Technology (MIT) and Harvard University, and a center at Stanford University. These HIC provide expertise in an array of issues, from intellectual property and market assessment to institutional review board processes in addition to bringing scientists and clinicians together. One component of Yale’s and others’ programs is the “Hackathon” model for generating ideas; the center identifies an unmet need, and teams apply to participate in problem solving, with the incentive of financial and other support for developing the innovation further. The Yale Center and other HICs include courses and programs for a wide range of students, faculty, and staff throughout the university and serve as examples of institutions taking a multi-pronged approach to health care innovation.

Some programs focus on graduate and medical student trainees, with the goal of enhancing students’ translational research skills and interests early in their careers. Begg and colleagues analyzed programs designed to open the pipeline to translational research from graduate students [7]. They recognize the tension between the depth of discipline-specific expertise required for Ph.D. students and the interdisciplinary training needed for translational research; they iden-



tify additional training opportunities through courses and seminars in multiple disciplines, interdisciplinary courses, laboratory and field experiences, and interdisciplinary team projects [7].

#### **WHAT SKILLS AND ATTITUDES SHOULD STUDENTS HAVE BEFORE THEY START THEIR GRADUATE MEDICAL TRAINING THAT WOULD LEAD THEM TO BE INNOVATIVE AND EFFECTIVE PARTNERS IN TRANSLATIONAL RESEARCH?**

Many of the programs have existed long enough for institutions to be able to evaluate their effectiveness, which they measure in a variety of ways, such as through survey data about interdisciplinary and translational research, publications, new therapy development, and career trajectory [4,5]. Evaluation of current programs in the USA designed to increase the number of translational researchers has shown a few key characteristics of successful programs. Effective communication, a truly multidisciplinary and diverse team, training for the mentors and teachers, and institutional commitment are all important factors in success.

#### **COMMUNICATION**

Assessment results from varied programs show that communication skills are critical for a team's and individual's success [4, 8]. Most programs begin with teaching every participant how to have productive conversations with team members from different backgrounds and career stages. A straightforward aspect is learning to avoid discipline-specific jargon, which sets up barriers to communication and can establish a competitive rather than cooperative atmosphere. Participants also learn how to listen; people may think they already know how to listen and participate in meetings, but the skills of active listening and allowing participation by all team members is an essential skill that can be taught by people trained in group dynamics and communication.

Another aspect of communication is public speaking, and most programs also teach how to give presentations and provide many varied opportunities for participants to practice speaking, whether through conferences or community outreach. In some programs, leadership development incorporates training in communication [4].

#### **STRUCTURED MENTORING**

While the teams address an array of topics, all have shown that structured mentoring is important [4,5,6]. The role of mentors may include assistance with study planning and design, and review of grant drafts and manuscripts. Mentors usually provide general professional advice, encouragement, and feedback. Training

for mentors is important since they learn how to give feedback and how to be good mentors through regular, constructive communication, helping mentees and teams achieve goals. Mentoring is not unidirectional, from professor to student/trainee; rather, the mentor should be open to learning from the student, and peer to peer mentoring is also valuable.

#### **COURSEWORK AND INNOVATIVE PEDAGOGY**

Many programs incorporate coursework in areas that many trainees would not have had prior to participation in the program, such as basic computer science and bioinformatics in addition to the teaching of communication and leadership skills. Ideally, undergraduate students would get some exposure to these topics, either at their university or through summer research. Durairajanayagam and colleagues describe a summer undergraduate research program at the Cleveland Clinic with the explicit goal of recruiting physician scientists to pursue translational research [9]. Their program includes coursework in the scientific underpinnings of the research project, scientific writing, hands on experience at the bench, and communication skills. Surveys of participants suggested that all aspects of the program were of value, but especially the training in scientific writing and oral communication [9]. This program is relatively small, and it would be beneficial for many undergraduates to have such an experience.

One way to increase the number of undergraduates who have the skills and interests to engage in interdisciplinary team-based translational research projects is to incorporate training into regular coursework. In the Keck Science Department of Claremont McKenna, Pitzer, and Scripps Colleges, we designed and implemented an interdisciplinary introductory course, Accelerated Introductory Science Sequence (AISS) with support from the National Science Foundation, that combined biology, chemistry, and physics in a novel way [10]. Students learned how to tackle complex, multidisciplinary problems through teamwork, both through problem-based learning in the classroom and in the lab. The innovative pedagogy incorporates many of the skills needed for translational research, and a higher percentage of students who took the course pursued interdisciplinary science majors relative to those who took the traditional format [10]. We have been able to expand the model to reach more students, by combining two disciplines rather than three at a time, while continuing the emphasis on interdisciplinary science and teamwork.

#### **INSTITUTIONAL SUPPORT FOR PROGRAMS THAT FOCUS ON TRANSLATIONAL RESEARCH CAREER PREPARATION**

A finding common to successful programs is that the institution is fully committed to the program's suc-



cess. The institutional leadership must demonstrate commitment by rewarding those who participate and explicitly valuing interdisciplinary projects. Institutions must provide financial support for the programs that build on external funding. The best programs include training in communication, mentoring, and writing in addition to tackling important health care issues; they also include a robust assessment plan and program coordinators, all of which require institutional funding. Measuring and communicating program outcomes within and beyond the university community is beneficial for recruiting new team members, raising the profile of the participating institutions, and potentially for attracting additional funding.

Institutions must provide incentives for participation; for example, faculty who serve as mentors or are junior researchers taking advantage of the training opportunity must have confidence that engaging in translational research is beneficial rather than harmful for their career. Multidisciplinary teams result in multi-author publications, and committees that review faculty for appointment, promotion, and tenure must recognize the value of interdisciplinary, team-based research, and administrators (provosts, rectors) must communicate to these review committees why translational research is important for the institution. The trainees must be able to see how the addi-

tional or different training provided by a translational research program will enhance their career prospects, whether by making them more competitive for post-doctoral or residency programs, grants, or positions in industry.

## CONCLUSION

Institutions in the USA have developed translational research training programs for students and faculty at different career stages. Many have established health care innovation centers as well, explicitly bridging the health care and business sectors. Commitment from the NIH has been essential for institutions to create multi-institution partnerships and to set national standards for expectations of such programs. Many of the lessons learned from these programs and centers in the past decade are instructive for institutions outside the USA that are starting translational research programs. While there will be site-specific concerns, all programs should incorporate communication skills, structured interdisciplinary teams, and mentorship training. In addition, the institutions involved must be fully committed to the programs, as demonstrated by financial and policy decisions, and governmental support should help further the goals of improving health care through innovative translational research.

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# HOW TO WRITE AN EFFECTIVE RESPONSE LETTER TO REVIEWERS

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**A** – study design, **B** – data collection, **C** – statistical analysis, **D** – interpretation of data, **E** – manuscript preparation, **F** – literature review, **G** – sourcing of funding

## ABSTRACT

The review process is intended to provide an objective assessment of the suitability of a submission to the target journal. When authors receive the decision letter from the editor it is almost always accompanied with the reviews, which at times can be quite critical. Writing a well-constructed response letter to the reviewers, with well-reasoned arguments, is a key part of the reviewing process. Although the manuscript is the main focus of the submission, the content and tone of the response letter can have a surprisingly large impact on the eventual recommendation given by the reviewers. The importance of writing a clear response letter is often overlooked by authors. This prompted us to prepare a short article addressing the main points that can help authors prepare their response to reviewer letter to the reviewers.

Although each review is unique, here, we outline ten points which are aimed at helping authors respond effectively and clearly to reviewers' comments. The points are based on the authors' collective experiences which includes publishing and reviewing for international peer-reviewed journals. The tone of the letter should always be professional, organized and objective. Each point raised by the reviewers needs to be replied to in a precise way, with clear evidence that the major concerns have been considered in a serious way. This article also covers what information should be included, when it is appropriate to disagree with a reviewer, and how to present appropriate rebuttals.

**KEYWORDS:** academic writing, response letter, article sections, tips

## BACKGROUND

All authors know that receiving a decision letter from a journal is one of the most stressful moments in the manuscript evaluation process. All authors wait in anticipation, repeatedly checking their inbox, for the moment they can read whether their paper has been accepted. The decision letter states whether the manuscript has been rejected, accepted, or requires major or minor revisions. Authors often take the first result very personally as if it was an assessment of the validity of their research. It is important to recognise that rejection is actually quite common when targeting higher impact journals – i.e. some journals only have a 20-30% acceptance rate; therefore, the vast majority of submissions will in fact be rejected for reasons not necessarily related to quality of the research. Independent of the outcome, reviewers spend many hard hours reading each submission and identifying what they consider to be the major and minor flaws with the work and assess

suitability for the target journal. Reviewers often point out the strengths of work as well and may complement authors when a study has been rigorously carried out. Consequently, we should not see the review process as a procedure invented to find every possible shortcoming of the paper. It is designed to provide constructive criticism and stimulate the research process – all communicated via the review form.

This article deals with situations where authors have been invited to submit a revised version of their manuscript. In this situation the authors will have to respond to the reviewers' criticisms and modify the body of the main text accordingly. Being invited to respond to reviewers' comments is good sign. It means at this point your paper has the potential to be accepted and has not been rejected by the editor. Alongside the necessary modifications that you have to make within the manuscript, how you write your response to the reviewers can become a make or break moment for the entire

process. Reviewers will be asked again to comment on the work and submit a recommendation decision about the revised work. It is important to remember that the reviewer has already carefully read the submission, so may not dedicate quite so much time reading or re-reading the second version. Therefore, it is extremely important to make this part of the reviewing process as easy as possible for the reviewer. This is mainly achieved by a comprehensive response to the reviewers' letter where each point made by the reviewer is clearly addressed and answered or rebutted.

### TEN TIPS FOR RESPONDING TO REVIEWERS

The purpose of this article is to provide advice on how to respond appropriately to reviewers' comments. This is drawn on our collective experiences as authors of international peer-reviewed papers and reviewing for international journals. Ultimately, the final decision will rest with the scientific integrity of the work submitted. However, the ten steps that we recommend below, when followed, will certainly strengthen your response letter.

- 1. Start with a short summary:** Before you detail your point-by-point response to the reviewers, we recommend writing a short paragraph summarising the most substantive changes in the paper (but do not go into detail – keep it short and simple at this stage). It should be obvious from the reviewers' comments what the main concerns are and these should be briefly addressed. For example, if you added new figures or expanded the analyses to support your conclusions, then mention this here. If you have restructured or completely refocused the paper as per suggestions, then this should be included. Then, state that you have responded to all the reviewers' comments below (make sure you do respond to all the comments) and include your comprehensive response to the reviewers' letter.
- 2. Thank the reviewers:** Reviewers often are very busy researchers themselves and invest many hours into reading your paper, often providing a comprehensive review of the submission without remuneration. In many cases, reviewers write extensive comments which reflects their time taken and the hope that the research results presented in the paper will be a valuable addition to the scientific world. It is extremely important that you also take time (and demonstrate that you have taken time) to provide carefully thought-through and sufficiently detailed responses to ALL the points raised by the reviewers. A response letter that is terse and rushed will do you no favours in the minds of the reviewers – they expect that the author cares about the reviewers' opinions and will make a clear effort to achieve the expected quality.

- 3. Make it easy for the reviewers:** The reviewer may not invest as much time in reading the main manuscript as in the response letter. The purpose of the letter is that you are responding to the specific points made by the reviewer and they will be naturally interested to know how you have addressed their concerns. Reviewers typically number their comments to the authors' letter. Therefore, it is quite straightforward to copy and paste the comments into a new file and insert your replies below each point raised by the reviewers. It is crucial that every single remark is responded to, with the details about what you changed and why clearly stated underneath. If a point has several sub-points, then it is important that all the concerns raised are thoroughly responded to.

A reviewer may have proposed an alternative mechanism or suggested your explanation is far-fetched and should be rephrased, if not removed. Where a more substantive comment is made (or major revision suggested) statements such as "we have included the necessary revisions outlined by the reviewer in the discussion" or "we agree with all suggested changes" become 'lazy' responses which may irritate the reviewer. It is not a point in your favour. A reviewer will expect you to summarise specifically what changes you made (e.g. if you agree with the reviewer then state this and explain what new material you added, any supporting references, any caveats). Of course, it is also acceptable to disagree with the reviewer by providing a well-supported argument.

- 4. Respond to ALL comments:** We cannot stress this point strongly enough. Sometimes an author will deliberately avoid answering a key point and hope that the reviewer will not mind or notice. However, in most cases, if a key point is ignored, you may expect quite harsh feedback from the reviewer, which make it much harder to publish in the target journal.

It may happen that the same point has been raised by more than one reviewer – if this happens do not copy and paste or tell the other reviewer to "see response to Reviewer 1". This, again, is a lazy response and may make the reviewer feel that his/her point did not warrant the same attention as the other reviewer's. Reviewers are not usually deliberately harsh and do want to see their effort appreciated. It does not take much effort to reword the response to the same or similar remark, especially since the overall context where the point was made may be different and a more personalised response can be given.

- 5. Remember most comments will be constructive feedback:** It is normal to feel defensive if you have had your work criticised. Review is by definition an evaluation, so both strengths and, unfortunately, weaknesses have to be pointed out

to initiate improvement. It is important, although difficult, to remain objective when writing your response letter. Reviewers, even if they recommend substantial changes, are usually trying to test the robustness of the main results and/or develop a deeper understanding of the study. This is an important part of the peer-review process which ensures that work that has sufficient scientific merit and there are no obvious gaps in the study. Journals care about the quality of the published papers and critical review of the paper is, unfortunately, an unavoidable part of this process.

Suggested changes are not always substantial. Reviewers will also point out minor changes which can be genuine mistakes made by the author in rush. These also need to be responded to appropriately (see example below).

- Reviewer: *The units of the colorscale is not indicated in Figure 1A or the corresponding legend*
- Response: *This was an oversight and we have added the units as requested*

**6. It is OK to disagree with a reviewer:** Disagreements are all part of scientific advancement, but it is important to be polite and, if necessary, firm. If a reviewer has highlighted something which you believe to be clearly wrong, for example that results from the experiment are in line with hypothesis A and not B, then it is important to point this out with supporting references to justify your position. It is crucial to remember that there can often be multiple interpretations of data as well as explanations for why specific results were obtained. The differences often lie in the paradigm familiar to the reviewer. If the suggestion made by the reviewer is plausible, then it makes sense to include this as an alternative explanation along with any reasons why you, as the author, consider this to be more or less valid. The resulting conclusions will be more comprehensive and more diverse. For example, you may use a structure like this: “Alternatively, it could be argued that [...]; however, we consider this less likely since [...]” A reviewer may request you introduce new methodologies to support your conclusions, for example the use of optogenetic techniques. If this is clearly outside the area of the study (and you honestly consider the methodology and data used are strong enough) then it is perfectly reasonable to thank the reviewer for their suggestion and state that this methodology is beyond the scope of this particular submission. It should be mentioned that if opportunities arise to carry out this type of work, then it would necessitate a new study potentially reinforcing the new quality your paper brings into the approach to the examined issue.

**7. The response letter may be the main document read after the first review:** Do not

underestimate the importance of a strong response letter. When revising the manuscript, many authors put almost all of their effort on the revision of the main text, without concentrating equal or sufficient attention to preparing the response letter. As stated previously, some reviewers will carefully read the response letter, but only scan the post-revision manuscript. If it is written in a careless or negligent manner, the reviewer may be under the impression that the same approach was assumed while revising the paper. Therefore, it is essential your response is persuasive and fully thought through.

**8. Strike the right tone:** In connection with the fifth point, it is easy to be overly defensive since your work may have been heavily criticised. It is important to remember reviewers are trying to test the robustness of the study. If there are weak points then as researchers they are professionally obliged to acknowledge this. On the other hand, you do not want to go to the other extreme and be overly apologetic. The work is after all yours and the main author has to come across as knowledgeable and believing in the validity of research, otherwise your whole study can be undermined.

**9. Include supporting information:** Researchers often carry out complementary research projects and, therefore, may have new unpublished data which supports the conclusions of the submitted piece of work. It can sometimes be persuasive enough to include this in the response letter, clearly stating that you are showing the reviewer the data in confidence since. This additional material demonstrates that your finding is reproducible, but that the latest finding is part of a new study that addresses a different question (which will be part of a follow-up paper); therefore, you do not want to include it in the current submission. A specific example from one of Dr Hunt’s studies is shown below:

- Reviewer: *I would expect a control of some sort for the ketamine injection itself – perhaps saline/vehicle control. Better yet would be other related pharmacologic agents, such as MK801.*
- Response: *As mentioned above, we have provided control data which is now clearly stated in the main text and also provided in Supplementary figure 1.*

*In parallel to the current study, we have also carried out experiments examining the effect of 0.15 mg/kg MK801 on the power of HFO in the bulb. This study although confirmatory is slightly different since muscimol or saline were infused to the OB after MK801 injection, in other words when the power of HFO was already substantial (as opposed to pretreatment and ketamine injection). However, the main message is the same and consistent with what we report in our submission. We would like to show this data in con-*



*fidence to the reviewer to demonstrate that this work has been done. We would rather not include this in the current submission since it is part of a large ongoing project, and not directly related to the effects of ketamine we report here.*

Including this type of additional data presents your work in a wider context and shows that you want to approach the examined issue from different perspectives, including those suggested by the reviewer.

- 10. Make sure you text is written in proper English:** When reviewing a manuscript reviewers are often asked to comment on the quality of the English. In many cases reviewers will point out sentences or phrases that are ambiguous or typographical and grammatical errors. It is actually quite common for there to be a few language errors, even in texts written by native English speakers, however, when these become too substantial that the fundamental understanding of the work is jeopardized a reviewer may well become overly critical. If a reviewer provides a list of language edits we recommend writing 'Done', or similar, next to each one as it shows every individual edit should have been made. It is important to ensure the English language in the cover

letter is a high standard, since a badly written response letter is likely to indicate that the quality of the English in the manuscript may also be weak. It is there extremely important to ensure both your response letter and revised manuscript have been checked by one of the authors who is fluent in English or a native English speaker.

## SUMMARY

The review process can be intense for all parties involved, especially when the reviewers and the authors are very passionate about the research area. The reviewers' remarks are in principle aimed at improving the paper and achieving the high standard expected by the journal. Responding to reviewers' comments provides an opportunity to exchange ideas and improve the study, so it should not be perceived as overly negative (there are of course bad reviews, where a reviewer fundamentally does not understand the work or may be competing in the same area, but in our experience these are relatively rare – in this case it is recommended to contact the section editor and request an appeal). It is our hope that outlining these ten steps for preparing a convincing response to reviewers' remarks will be helpful to all authors working on their publications.

## REFERENCES:

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e) Chapter within a book

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