SPECIAL REPORT

Attitudes of healthcare professionals towards the introduction of rapid response teams in Poland: a survey study after 6 months of a pilot program in 25 hospitals

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Introduction Rapid response team (RRT) systems are widely utilized around the world, particularly in high-income countries.[1] The rationale behind these systems is that early identification of deteriorating patients hospitalized outside of intensive care units (ICUs) should decrease in-hospital morbidity and unexpected mortality. It is additionally increasingly recognized that such initiatives enhance communication, facilitate professional development, and may help improve the quality of end-of-life care.[2,3]

Rapid response teams are composed of different healthcare professionals (physicians, nurses, paramedics) and aim to bring ICU-level skills and care outside of the ICU. Interventions delivered by the RRT may range from basic clinical assessment in a patient with shortness of breath, through administration of an antidote in patients on direct oral anticoagulants with life-threatening bleeding, to intensive fluid resuscitation and appropriate antimicrobial therapy in previously unrecognized septic shock.[4-7] Ideally, any intervention should result either in prompt management at the patient's bedside or a timely transfer to the ICU.[8] According to evidence from meta-analyses, RRTs can reduce in-hospital mortality both in adult and pediatric populations.[9]

In July 2018, under the supervision of the National Center for Quality Assessment in Health Care, we launched a pilot study for a nationwide RRT implementation program in 25 hospitals (both teaching and nonteaching; 250–1500 beds each) evenly distributed around Poland.[10]

One of the main concerns about implementing the RRT system in Polish hospitals was an increased workload of active RRT members, as additional staffing was not feasible in most participating hospitals at the time of enrollment to the pilot study. Therefore, prior to initiation of the program, we designed a questionnaire that aimed to assess, after 6 months, the perceived change in workload and job satisfaction associated with the RRT introduction. We also asked healthcare professionals about their perception of their own safety and comfort at work and the influence of RRT implementation on patient safety. Our secondary objective was to test whether attitudes toward RRTs differed between members of the afferent and efferent limbs of the system and between physicians and nursing staff.

Methods The program was initiated with a 3-month period of internal staff training aimed at explaining the rationale behind RRTs, and it included a 1-day course on the most common acute medical emergencies followed by 1-day training in communication skills (both were conducted in each center). We trained both the interventional

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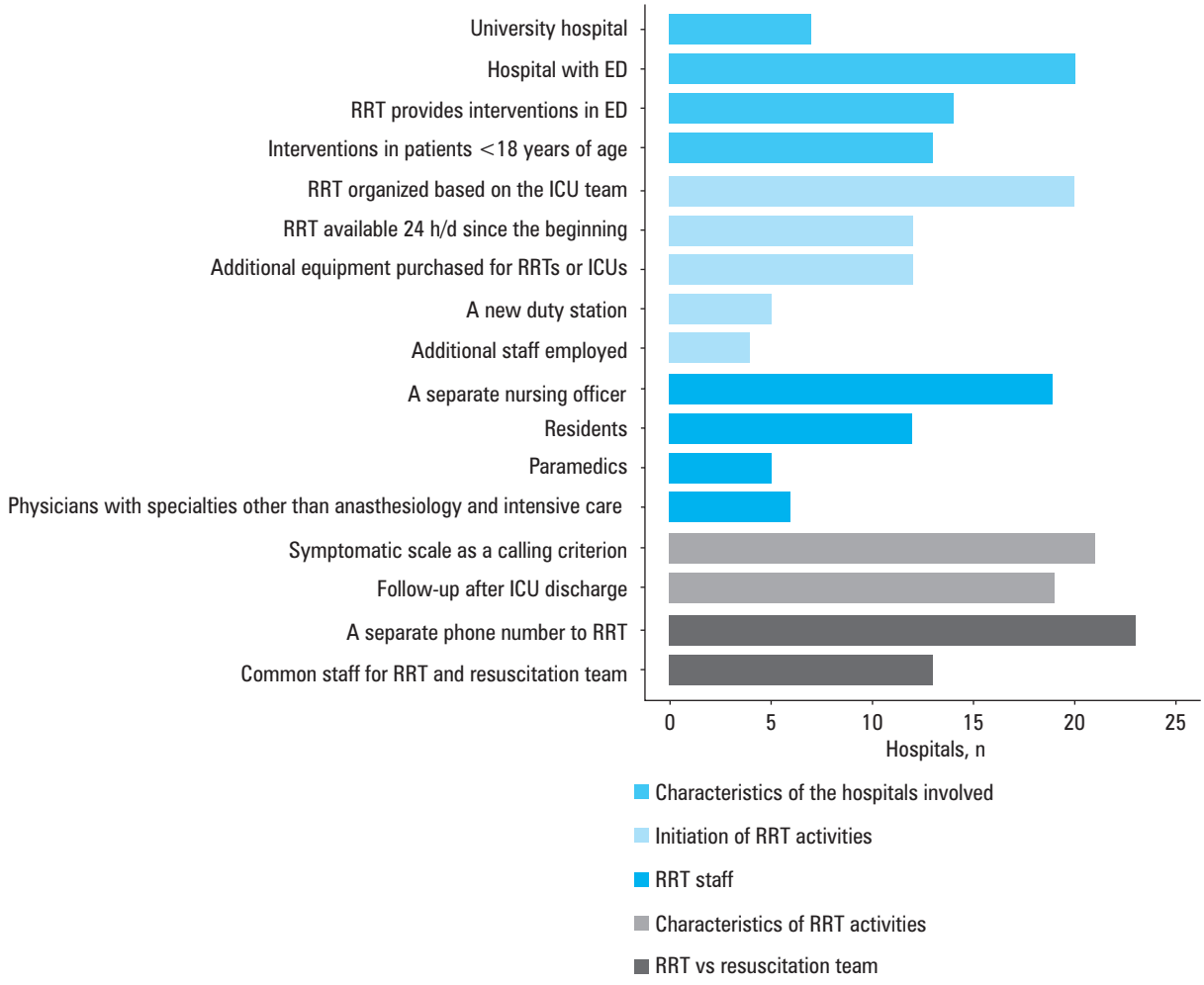


FIGURE 1 Characteristics of the implementation of rapid response teams in participating hospitals (figure courtesy of the editor-in-chief of *Anaesthesiology Intensive Therapy*[10])
Abbreviations: ED, emergency department; ICU, intensive care unit; RRT, rapid response team

team (outreach, the efferent limb of the system) and hospital ward staff (the afferent limb, responsible for identifying deteriorating patients and triggering the response). In most hospitals, the outreach team consisted of ICU personnel (a physician-led team with a nurse and residents as team members if available), but different compositions of the team were allowed to accommodate local organizational variations. Criteria of system activation in most hospitals were established based on abnormalities of critical vital parameters (changes in respiratory, circulatory, and central nervous system function). Two hospitals used the National Early Warning Score (NEWS 2) to systematically identify at-risk patients and standardize the trigger and response system.[11] In all hospitals, we encouraged activation of the system in case the staff had serious concerns about the patient's clinical condition, even in the absence of specific objective clinical measures of clinical condition deterioration.

We distributed a self-administered 11-item questionnaire to healthcare professionals (nurses, clinicians, quality assessment and administrative workers) in selected hospitals from 13 voivodeships participating in the pilot RRT program. The first 5 questions concerned descriptive characteristics (geographical region, profession [physician, nurse, paramedic, quality assessment or administrative worker], primary workplace, work experience, role in the RRT), and the other 6 directly asked about individual perception of RRT introduction. The questions about attitudes towards RRTs are listed below.

Did the introduction of the RRT to the hospital:

1. Bring positive effects for the hospital?
2. Improve patient safety?
3. Accelerate interventions in at-risk patients?
4. Improve your comfort and work safety?
5. Improve your job satisfaction?
6. Increase your workload?

The answers to each question included 5 possibilities: 1) Definitely yes; 2) Rather yes; 3) I have no opinion; 4) Rather not; and 5) Definitely not.

The questionnaire was nonpersonalized and available electronically through a dedicated link to the MetaClinician® website (www.metaclinician.com). Participation in the survey was voluntary, and no formal assessment of the response rate was performed. After the initial distribution of the questionnaire, we sent a reminder to team leaders or administrative representatives in the

TABLE 1 Overall and stratified results of the survey

Domain	Overall (n = 997)	Afferent limb (n = 845)	Efferent limb (n = 152)	*P* value	Nursing staff (n = 687)	Physicians (n = 257)	*P* value
Professional affiliation							
Nurse	687 (68.9)	597 (70.7)	90 (59.2)	0.005	687 (100)	–	–
Medical doctor	257 (25.8)	214 (25.3)	43 (28.3)	0.44	–	257 (100)	–
Paramedic	27 (2.7)	11 (1.3)	16 (10.5)	<0.001	–	–	–
Quality assessment worker	18 (1.8)	17 (2.0)	1 (0.7)	0.25	–	–	–
Administrative worker	8 (0.8)	6 (0.7)	2 (1.3)	0.44	–	–	–
Work experience							
0–5 years	134 (13.4)	114 (13.5)	20 (13.2)	0.91	70 (10.2)	51 (19.8)	<0.001
6–10 years	89 (8.9)	70 (8.3)	19 (12.5)	0.09	40 (5.8)	38 (14.8)	<0.001
11–15 years	134 (13.4)	117 (13.8)	17 (11.2)	0.38	88 (12.8)	31 (12.1)	0.76
>15 years	640 (64.2)	544 (64.4)	96 (63.2)	0.77	489 (71.2)	137 (53.3)	<0.001
Primary workplace							
Emergency department	40 (4.0)	24 (2.8)	16 (10.5)	<0.001	15 (2.2)	7 (2.7)	0.62
Intensive care unit	121 (12.1)	31 (3.7)	90 (59.2)	<0.001	72 (10.5)	41 (16)	0.02
Medical	187 (18.8)	176 (20.8)	11 (7.2)	<0.001	119 (17.3)	67 (26.1)	0.003
Surgical	208 (20.9)	198 (23.4)	10 (6.6)	<0.001	153 (22.3)	54 (21.0)	0.68
Other	441 (44.2)	416 (49.2)	25 (16.4)	<0.001	328 (47.7)	88 (34.2)	<0.001

Data are presented as number (percentage).

hospitals within 2 weeks. Answers to particular questions were analyzed for all respondents combined and within several subgroups created according to respondents' role in the RRT (afferent or efferent limb of the system), professional affiliation (physicians vs nurses), job experience (<15 vs >15 years of professional experience), and primary workplace (emergency department [ED] or ICU vs other wards). We also analyzed results after using the 2018 Polish index of healthcare performance (Indeks Sprawności Ochrony Zdrowia) to stratify responses (3 categories based on the overall voivodeships' rating of healthcare: 90–106 points vs 109–114 points vs 119–127 points, which corresponds to top 4 vs middle 4 vs bottom 5 voivodeships in the ranking).[12]

Statistical analysis We performed all comparisons using the χ^2 or Fisher exact test as appropriate for categorical variables, and the Mann–Whitney or Kruskall–Wallis test for Likert-type questions. We used the Benjamini–Hochberg correction for post hoc tests. Two-tailed *P* values of less than 0.05 were considered significant. All analyses were performed using R version 3.6.0 (R Project, Boston, Massachusetts, United States). No ethics approval was required for this study.

Results Characteristics of the RRT implementation in participating hospitals are summarized in FIGURE 1. Overall and stratified characteristics of surveyed participants are presented in TABLE 1.

The distribution of answers to the 6 questions on attitudes towards RRTs stratified by respondents' role (afferent vs efferent limb of the system), professional affiliation, experience, primary workplace, and region of practice is presented in FIGURES 2–6.

With most answers positive, the members of the efferent limb were more likely to agree with the program's effectiveness and with the positive impact of RRTs on their job satisfaction than members of the afferent limb. At the same time, intervening teams reported an increase in workload more often than members of the afferent limb (FIGURE 2).

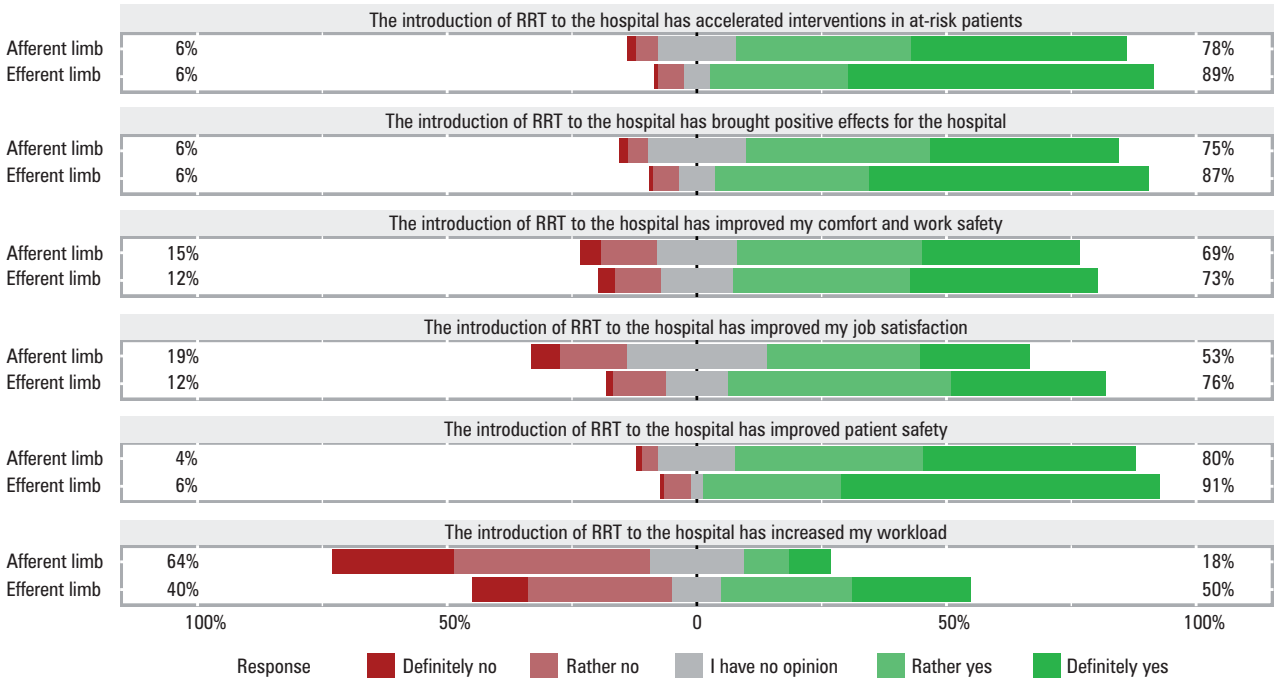
Although the results were pointing in the same overall direction, we found that physicians had a greater tendency to strongly agree on the perceived benefits for the hospital associated with the introduction of RRTs than nurses did, while the latter group more often experienced an increase in workload (FIGURE 3).

We did not find sufficient evidence to claim that attitudes towards RRTs differ based on years of professional experience (FIGURE 4).

The results of the comparison between healthcare professionals working primarily in the ED or ICU and other wards corroborated our former findings based on respondents' role in the system (FIGURE 5).

Personnel affiliated with hospitals located in voivodeships that ranked lower in the Polish index of healthcare performance perceived RRTs as having a relatively greater positive impact compared with voivodeships that held higher positions in the ranking (FIGURE 6).

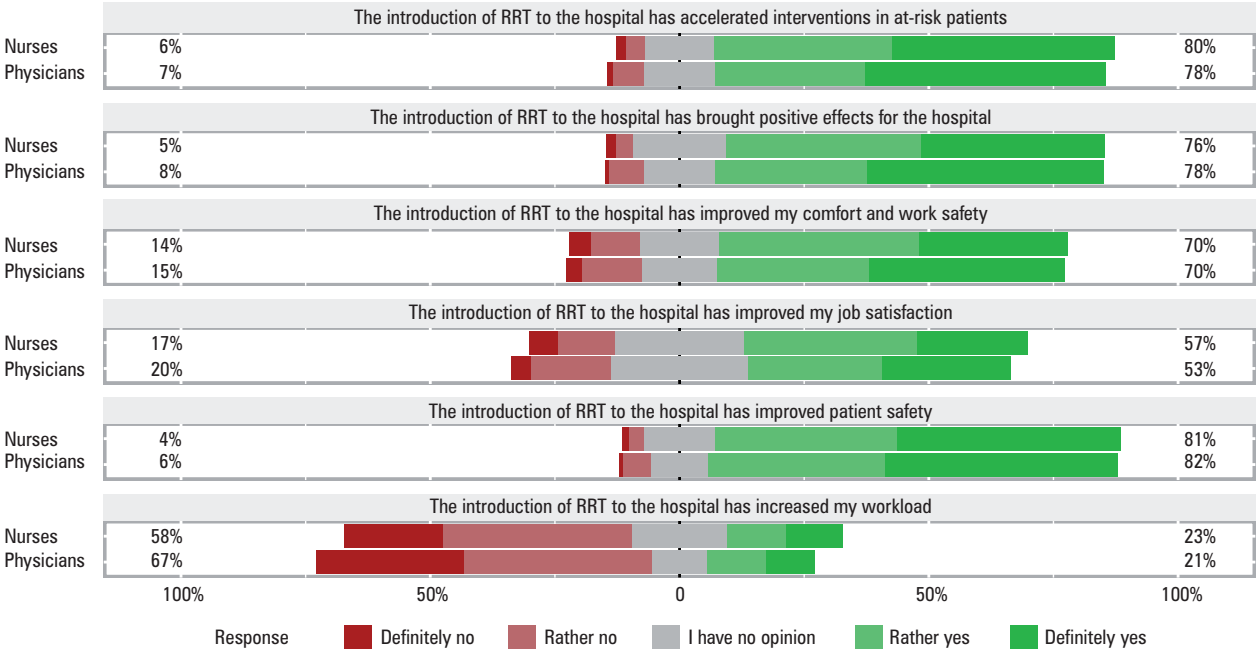
The results of the post hoc tests for differences in responses between distinct geographic regions on the overall quality of healthcare are shown in TABLE 2.



P values from tests of difference in mean ranks between the groups

Tested domain	*P* value
Accelerated interventions in at-risk patients	<0.001
Positive effects for the hospital	<0.001
Improved comfort and work safety	0.13
Improved job satisfaction	<0.001
Patient safety	<0.001
Increased workload	<0.001

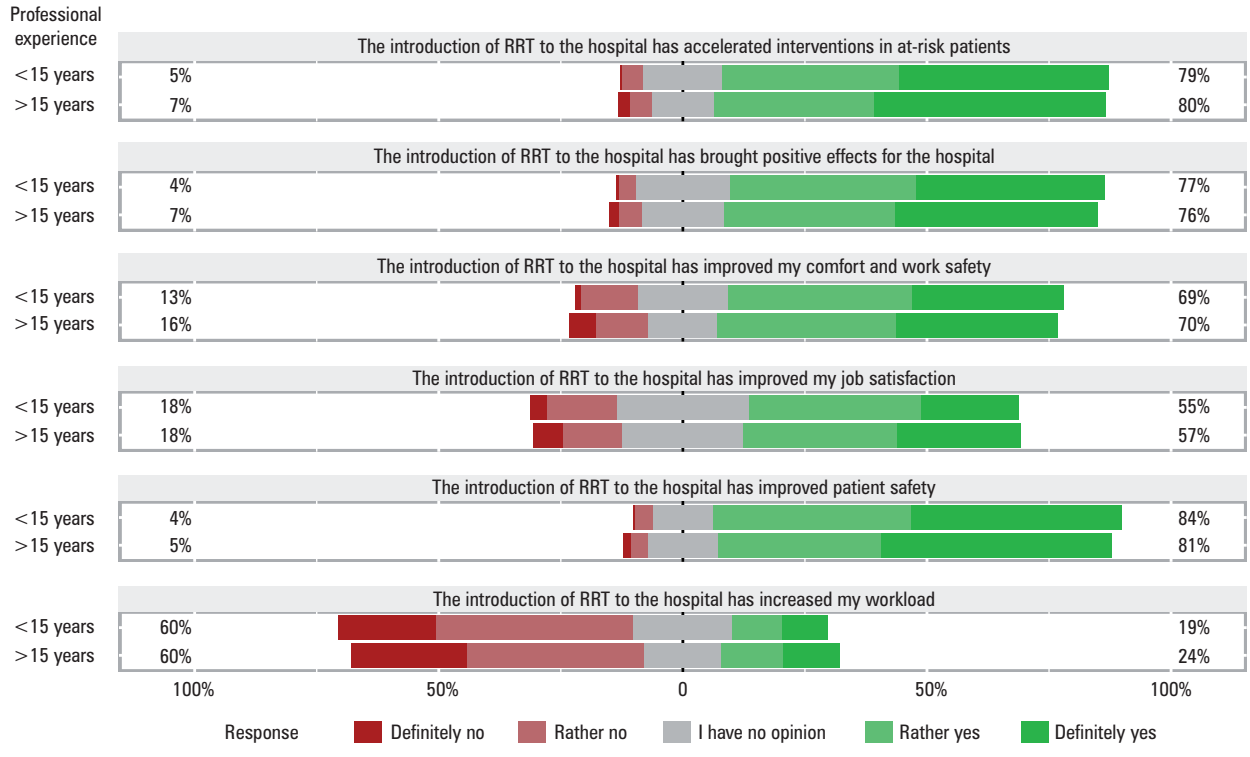
FIGURE 2 Distribution of answers stratified by the respondent's role in the rapid response team (afferent vs efferent limb of the system). The overall percentage of agreement (green, right-hand side) and disagreement (red, left-hand side) listed at both sides of bars; the numbers do not sum up to 100% due to a fraction of respondents declaring to be "undecided." Abbreviations: see **FIGURE 1**



P values from tests of difference in mean ranks between the groups

Tested domain	*P* value
Accelerated interventions in at-risk patients	0.67
Positive effects for the hospital	0.03
Improved comfort and work safety	0.11
Improved job satisfaction	0.74
Patient safety	0.69
Increased workload	0.003

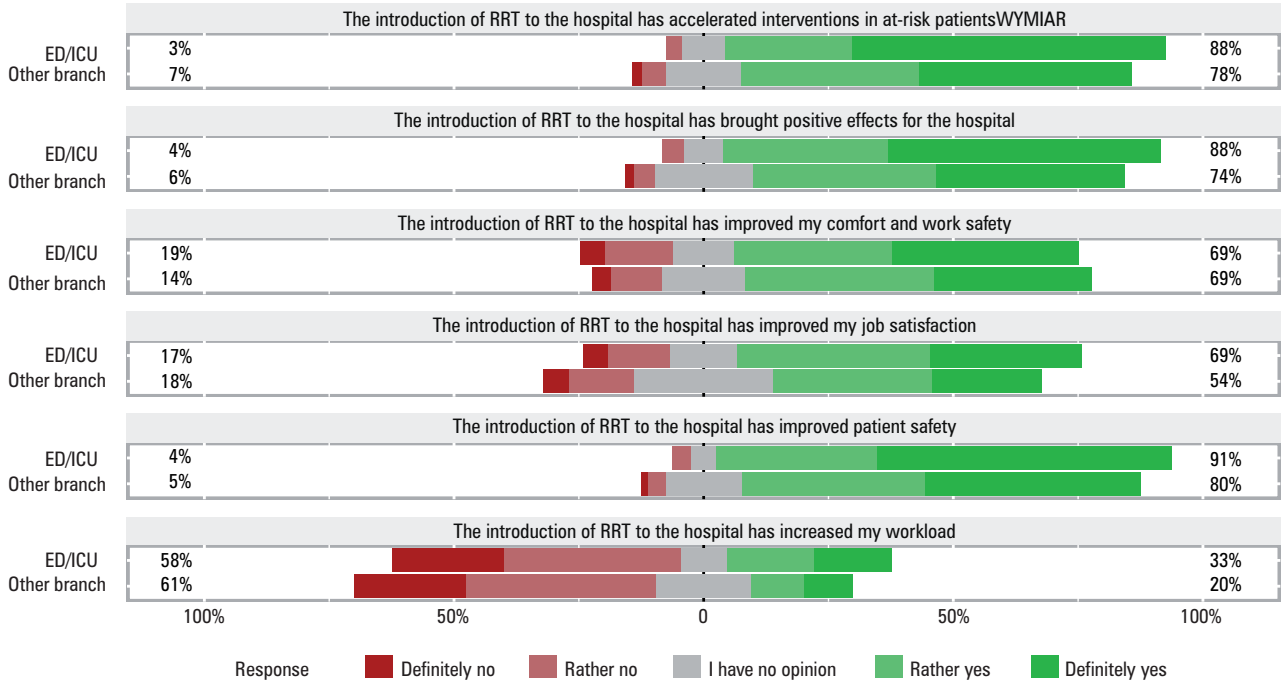
FIGURE 3 Distribution of answers stratified by the respondent`s profession (physicians vs nurses). The overall percentage of agreement (green, right-hand side) and disagreement (red, left-hand side) listed at both sides of bars; the numbers do not sum up to 100% due to a fraction of respondents declaring to be "undecided." Abbreviations: see **FIGURE 1**



P values from tests of difference in mean ranks between the groups

Tested domain	*P* value
Accelerated interventions in at-risk patients	0.28
Positive effects for the hospital	0.70
Improved comfort and work safety	0.92
Improved job satisfaction	0.37
Patient safety	0.67
Increased workload	0.95

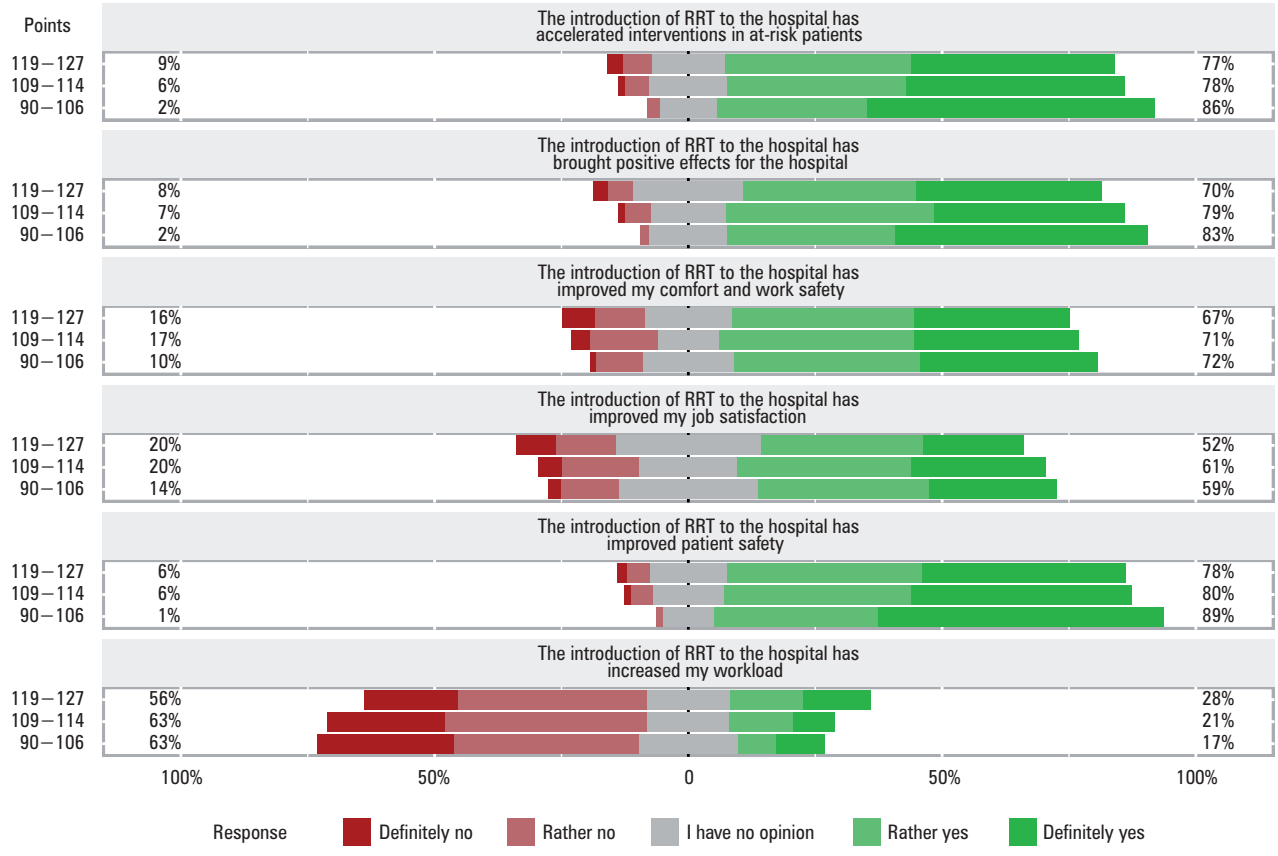
FIGURE 4 Distribution of answers stratified by the respondent's years of experience (<15 years vs >15 years). The overall percentage of agreement (green, right-hand side) and disagreement (red, left-hand side) listed at both sides of bars; the numbers do not sum up to 100% due to a fraction of respondents declaring to be "undecided."
Abbreviations: see **FIGURE 1**



P values from tests of difference in mean ranks between the groups

Tested domain	*P* value
Accelerated interventions in at-risk patients	<0.001
Positive effects for the hospital	<0.001
Improved comfort and work safety	0.61
Improved job satisfaction	0.004
Patient safety	<0.001
Increased workload	0.18

FIGURE 5 Distribution of answers stratified by the respondent's primary workplace (emergency department [ED] vs intensive care unit [ICU]). The overall percentage of agreement (green, right-hand side) and disagreement (red, left-hand side) listed at both sides of bars; the numbers do not sum up to 100% due to a fraction of respondents declaring to be "undecided."
Abbreviations: see **FIGURE 1**



P values from tests of difference in mean ranks between the groups

Tested domain	*P* value
Accelerated interventions in at-risk patients	<0.001
Positive effects for the hospital	<0.001
Improved comfort and work safety	0.16
Improved job satisfaction	0.024
Patient safety	<0.001
Increased workload	0.005

FIGURE 6 Distribution of answers stratified by the ranking of voivodeship in which a given hospital is localized, according to the Polish index of healthcare performance (Indeks Sprawności Ochrony Zdrowia) (110–127 points vs 109–114 points vs 90–106 points). The overall percentage of agreement (green, right-hand side) and disagreement (red, left-hand side) listed at both sides of bars; the numbers do not sum up to 100% due to a fraction of respondents declaring to be "undecided." Abbreviations: see **FIGURE 1**

TABLE 2 Results of statistical tests: differences in responses between distinct levels of overall regional geographic quality of healthcare according to the 2018 Polish index of healthcare performance (Indeks Sprawności Ochrony Zdrowia)

Response	Index of healthcare performance		
	119–127 vs 90–106	119–127 vs 109–114	109–114 vs 90–106
Accelerated interventions in at-risk patients	<0.001	0.36	<0.001
Positive effects for the hospital	<0.001	0.17	0.006
Improved comfort and work safety	–	–	–
Improved job satisfaction	0.04	0.86	0.05
Patient safety	<0.001	0.34	<0.001
Increased workload	0.03	0.52	0.008

Data are presented as *P* values (after Benjamini–Hochberg correction).

Discussion In this survey conducted 6 months after the initiation of the nationwide pilot RRT program, nearly 1000 participants anonymously answered questions on the perceived impact of the program on different aspects of healthcare. The overall perception of RRTs was almost uniformly positive across all assessed domains. The majority of respondents stated that RRTs had positive effects for the hospital, improved patient safety, accelerated interventions in at-risk patients, and improved workers' comfort, work safety, and job satisfaction.

Additional subgroup analyses led us to a number of interesting observations. Members of intervening teams expressed a remarkably high degree of confidence in the program's effectiveness,

which is encouraging for its continuation and future development. Of note, the perceived increase in workload was matched by an increase in job satisfaction, which we believe reflects the attitude of dedication and positive engagement prevailing in the efferent arm of RRTs. The relatively frequent reporting of increased workload by nurses likely mirrors the burning issue of understaffing in Polish hospitals. The similarity of comparisons between healthcare professionals working primarily in the ED or ICU and other wards and the afferent and efferent limbs of the system was expected because the majority of active RRT members are professionally affiliated with the ICU.

We were surprised to note a sign of a "dose-response" association between the overall quality of healthcare in voivodeships and the perceived benefit of introducing RRTs. This phenomenon manifested most clearly in the domain of patient safety, where 89% of respondents from regions ranked in the bottom 5 of the list claimed that RRTs had a positive impact, in contrast to 80% and 78% from regions categorized as the middle and top 4 in terms of their point score on the list, respectively. We hypothesize that there might be an interaction between the quality of healthcare and the benefit from RRTs such that this initiative is most beneficial in hospitals with the highest baseline need for improvement.

The main limitation of our study is that we did not monitor the number and characteristics of nonrespondents. This makes it difficult to establish to what extent the survey respondents represent the entire population of interest. This was a trade-off that we deliberately accepted to avoid increasing the already substantial administrative burden of the program. For the same reason, we did not collect extensive demographic characteristics of participants, yet this limitation is to some degree alleviated by the fact that responses were similar across different categories of job experience. The number of responses from paramedics as well as administrative and quality assessment workers precluded a detailed investigation of responses in these professions. Additionally, we did not analyze the impact of RRTs' working hours on the survey results, which could potentially be meaningful . Finally, we did not perform any sample size calculations prior to the study, which might have rendered particular subgroup analyses underpowered.

We are currently in the process of analyzing the effects of RRTs on significant events, including unexpected deaths, cardiac arrests, ICU admissions and readmissions, and some aspects of the quality of end-of-life care. Such analyses were performed before and suggested benefit.[9] This survey focused on organizational and social aspects: our results clearly show that the introduction of RRTs in Polish hospitals is potentially beneficial both for patients and personnel, at least according to the opinion of a large majority of close to 1000 healthcare professionals who responded to the survey. The success of any major organizational change depends to a great extent on the attitude of people involved, particularly in the setting of limited resources. We found those attitudes very positive, and our findings may assist others who are planning the introduction of similar programs in their respective countries.

In conclusion, the introduction of RRTs in Polish hospitals is perceived as beneficial by a significant majority of surveyed healthcare professionals.

ARTICLE INFORMATION

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CONFLICT OF INTEREST None declared.

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