



## Research Letters

## Improved Care, Similar Costs, and Improved Health Equity by Interprofessional Collaboration: An Economic Evaluation



The affordability of health care is under pressure due to rising health care costs and increased care demands.<sup>1,2</sup> Additionally, a shortage of health care professionals is expected to put further pressure on the health care system.<sup>3,4</sup> These 2 factors put the sustainability of the health care system at risk, and a reform of the health care system is required.

The World Health Organization (WHO) has proposed interprofessional collaboration (IPC) as promising health care reform.<sup>5</sup> However, 2 recent reviews investigating IPC showed mixed results on patient outcomes and that not a single study evaluated the costs of interprofessional care.<sup>6,7</sup> It is not sensible to widely implement a health care reform without knowing the associated costs.

To date, the Jeroen Bosch Hospital has a dedicated IPC practice: the Intensive Collaboration Ward (ICW) in which interprofessional care is provided to patients with multimorbidity. Two studies of the ICW showed high patient satisfaction and improved patient-related outcomes, but did not evaluate the financial implications.<sup>8,9</sup> The aim of this study was to perform a cost-consequence analysis that (1) presents the patient-related outcomes of the 2 previous studies, (2) performs a cost analysis, and (3) describes the associated implications for primary and secondary care.

### Methods

This study conducted a trial based cost-consequence analysis of the ICW using a health care perspective. To do so, this study presents patient-related outcome data from 1 intervention group (ICW) compared to 2 control groups: (1) within time frame,<sup>8</sup> (2) historical.<sup>9</sup> This study was conducted at the Jeroen Bosch Hospital, the Netherlands. A detailed description of the study groups can be found in previous ICW publications.<sup>8,9</sup>

The ICW is an interprofessional collaboration between the specialties of geriatrics, cardiology, internal medicine, pulmonology, and hospital medicine. The ICW was set up to provide care for older patients with multimorbidity. Every morning, there is a treatment meeting with a medical specialist from each specialty to

provide an integrated treatment plan for the patient. In addition, a hospitalist, nurses, and allied health professionals meet 3 times a week to discuss the patient in the broadest sense and develop a treatment plan. A more detailed description can be found in [Appendix 2](#) and the previous ICW publications.<sup>8,9</sup>

[Table 1](#) summarizes the data used as input for the cost analysis. All patient-related outcomes were used in the analysis. The ICW required additional time spent by professionals, namely, the employment of a hospitalist (1.33 FTE) and the time spent by allied health professionals for the 3 weekly meetings (0.25 FTE in total).<sup>8</sup> These additional personnel costs were divided equally among all ICW patients and added to their total cost. The daily treatment meeting with the medical specialist was determined to be a shift in time spent, as the number of patients in the hospital did not change, so there was no additional costs because of this. Apart from these additional staff costs, the operating procedures of the ICW did not generate any additional costs. Three sources were used for cost prices, all of which were adjusted for inflation: National Health Institute (ZIN) guideline for economic evaluations,<sup>10,11</sup> if not specified, a cost price was calculated from internal hospital data, and health professional costs were calculated using the collective labor agreement ([Appendix 1](#)). The total cost of care per patient per admission was then calculated. The total costs distribution was rightly skewed and analyzed by GLM Gamma regression. Baseline differences, namely, admission specialty and cognitive impairment, were taken into account.

To explore the implications for primary care, an interview with open questions to reflect on the results was conducted with Dr Marjolein van de Pol, a general practitioner, director of medical education at Radboud University Medical Centre, and professor of student well-being. For secondary care, a similar interview was conducted with Esther Cornegé-Blokland, a geriatrician and chair of the Medical Specialist 2035 program of the Dutch Association of Medical Specialists. After the analysis, they were both shown the results of this study and openly asked what the implications of these results were, with follow-up questions.

The Ethics Review Board METC Brabant (reference ID: NW2020-82 and NW2021-24) declared that the previous 2 ICW studies fell outside the scope of the Dutch Medical Research Involving Human Subjects Act.

### Results

[Table 1](#) shows an overview of the patient-related outcomes used in this study. To summarize, ICW patients had a shorter length of hospital stay, received more allied health professional consultations, and required less in-hospital and emergency department in-person consultations. After discharge, patients required fewer emergency department and outpatient clinic visits. In addition, the patients' experience of care did not differ.

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**Table 1**  
Overview of the Patient-Related Outcomes Included in This Study and Their Implications

	Control Group A: Within Time Frame (n = 51)	Control Group B: Historical (n = 239)	ICW (n = 200)	ICW Implementation: Implications of the Results for Employees and the Health Care System	
				Primary Care (GP)	Secondary Care
Length of hospital stay	↑	=	Reference	—	More patients can be treated More workload Beds could be closed, reducing personnel needed
In-hospital consults	↑	↑	—	—	Less workload
Emergency department (ED) in-person consults	X	↑	—	—	Faster ED turnover Less workload More patients can be treated
Allied health professional consults	↓	↓	—	—	More workload
Emergency department visits	=	↑	Less acute care and workload	—	Less workload Shorter waiting time More patients can be treated
Outpatient clinic visits	=	↑	More follow-up	—	Less workload Shorter waiting time More patients can be treated
Mortality rates	=	=	—	—	—
Readmission rates	=	=	—	—	—
Patient experience	=	N/A	—	—	More efficient care while maintaining patient satisfaction

GP, general practitioner; N/A, not available.

The equal-to sign (=) indicates no difference between groups; ↑ indicates a higher value than in the ICW group; ↓ indicates a lower value than in the ICW group; X indicates no statistics were computed because of low numbers.

Cost of care did not differ between groups. The cost of 1 admission was €3756 (3285–4295) for the ICW group, €3842 (3065–4823) for control group A, and €3790 (3290–4365) for control group B. Compared with the ICW group, control group A did not have a statistically significant difference in costs ( $B = 0.023$ ,  $P = .842$ ), nor did control group B ( $B = 0.009$ ,  $P = .904$ ).

Implications for primary and secondary care are summarized in Table 1. They show that health equity may improve. In addition, acute care disrupts a general practitioner's workflow and has a major impact, so reducing this burden is an important finding. For secondary care, the most important conclusion is that more patients can be treated with the same amount of staff, while maintaining high patient satisfaction.

## Discussion

This study showed that an interprofessional collaborative practice, specifically the ICW, has similar *patient satisfaction*, improved *patient outcomes*, and similar *costs* compared to usual care. In addition, this study reported the implications for primary and secondary care, which show that *health equity* may improve.

Nowadays, the evaluation of health care is often carried out according to the triple or even quintuple aim<sup>12,13</sup> which describes several objectives: (1) patient satisfaction, (2) patient outcomes, (3) cost of care, (4) health professionals' well-being, and (5) health equality. No previous study has reported (positively) on all of the first 3 (Triple Aim) outcomes of an interprofessional collaborative practice.<sup>6</sup> Therefore, this study is the first to demonstrate this. Furthermore, this study reports implications that describe that health equity could improve by freeing up beds, reducing workload, and decreasing the number of required staff. When looking at all results, one might conclude that ICW is a cost-effective modality. This further endorses the positive impact of an interprofessional collaborative practice in the Dutch health care system.

There is growing interest in this topic, with several protocol papers aimed at investigating the cost-effectiveness of IPC.<sup>14,15</sup> In today's health care challenges, gathering this evidence is becoming increasingly important.<sup>5</sup>

This study should be seen in light of some limitations. First, the complex nature of the intervention complicates generalizability to other settings. Second a previous study suggested the ICW would reduce the number of required residents (doctors training to become medical specialists) by 2.66 FTE.<sup>8</sup> However, this reduction has not been achieved as yet, and was therefore not included in the analysis. In contrast, the ICW did also not increase the number of required residents, which is beneficial given the growing shortage of health care workers.<sup>3,4</sup>

## Conclusions and Implications

This study shows that interprofessional care on the ICW has positive results on the goals of the Quintuple Aim: similar patient satisfaction, improved patient outcomes, similar cost, and indications for improved health equity compared to usual care. It would also be interesting to investigate staff satisfaction, the fourth aim of the Quintuple aim, when working interprofessionally.

## Disclosure

The authors declare no conflicts of interest.

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