

Clinical, Economic and Organizational Impact of a Validation Tool on Parenteral Chemotherapy

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Introduction

Parenteral chemotherapy is considered high-risk medication due to its narrow therapeutic margin, complex regimens, and frequent dose adjustments.

Despite Computerized Physician Order Entry (CPOE), drug-related problems (DRPs) remain present in daily practice.

In 2023, a structured validation tool was implemented in the Chemotherapy Preparation Unit (CPU) of UZ Brussel to standardize pharmacist prescription review process, aiming to enhance safety and efficacy at chemotherapy management.

Aims

- Evaluate clinical impact of pharmacist interventions (PI)
- Assess economic impact (direct drug cost savings)
- Analyze organizational impact (workflow & validation time)

Methods

Study design

1

Retrospective study of a quality improvement program conducted at the CPU

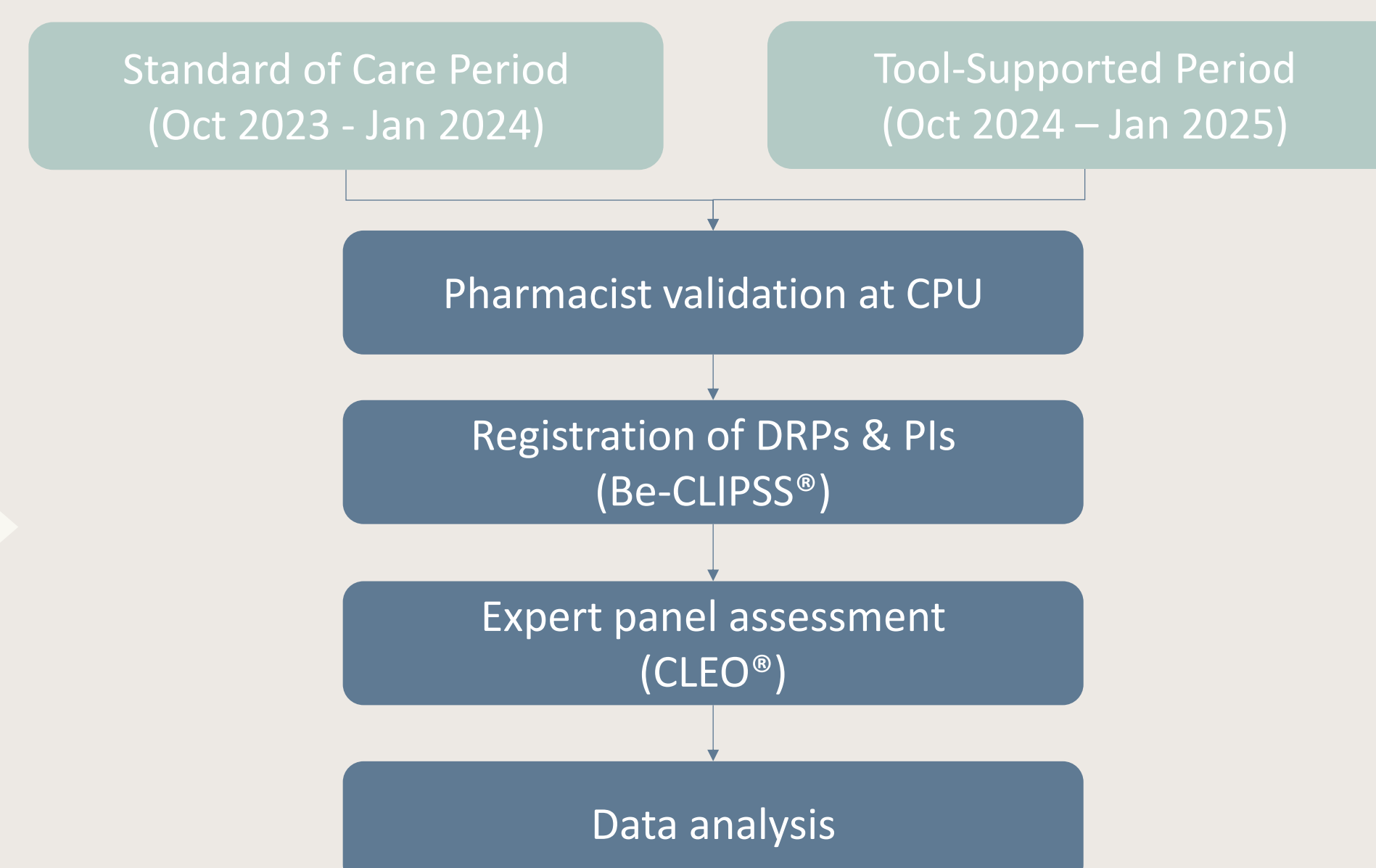
Comparison of two periods:

- Standard of care (Oct 2023 – Jan 2024)
- Tool-supported (Oct 2024 – Jan 2025)

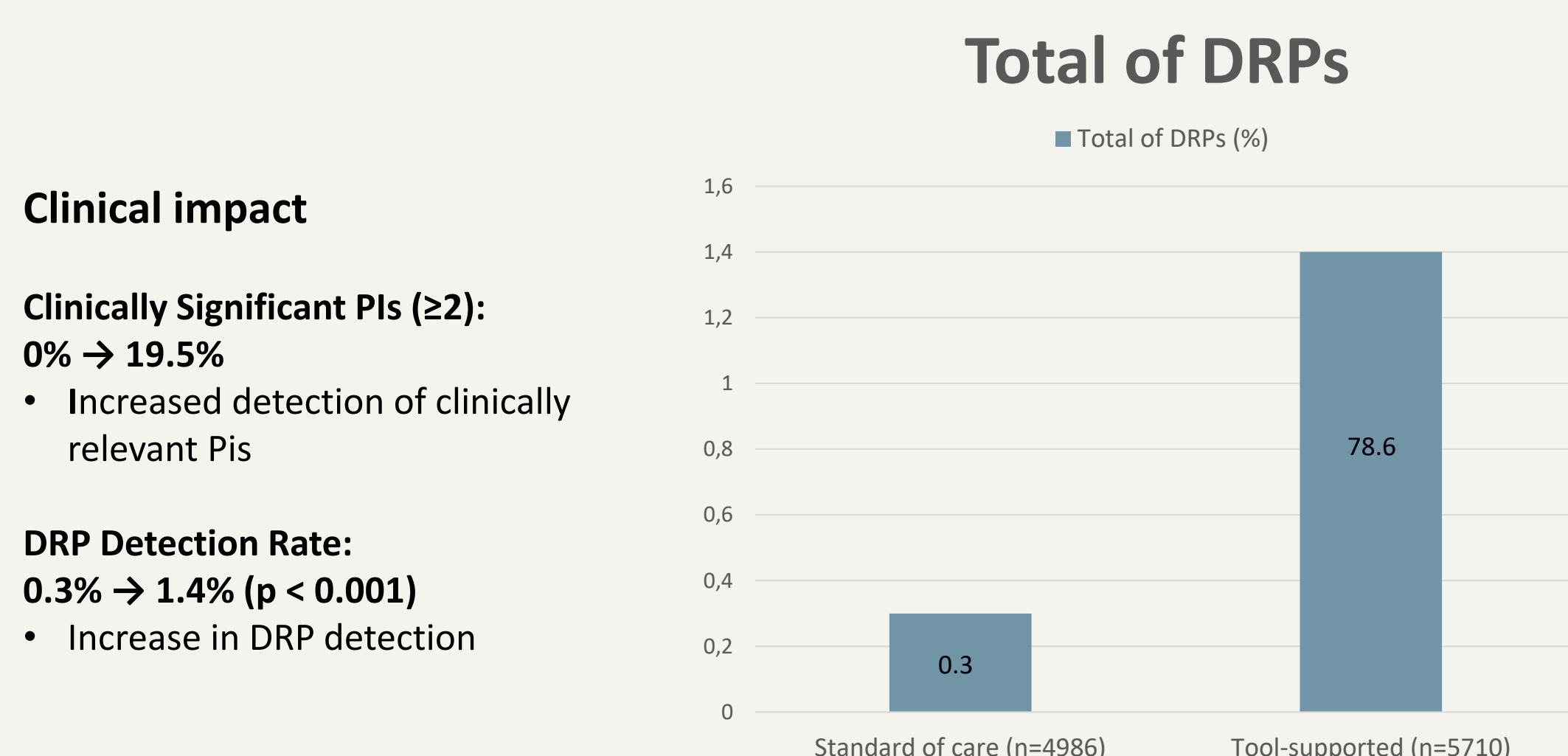
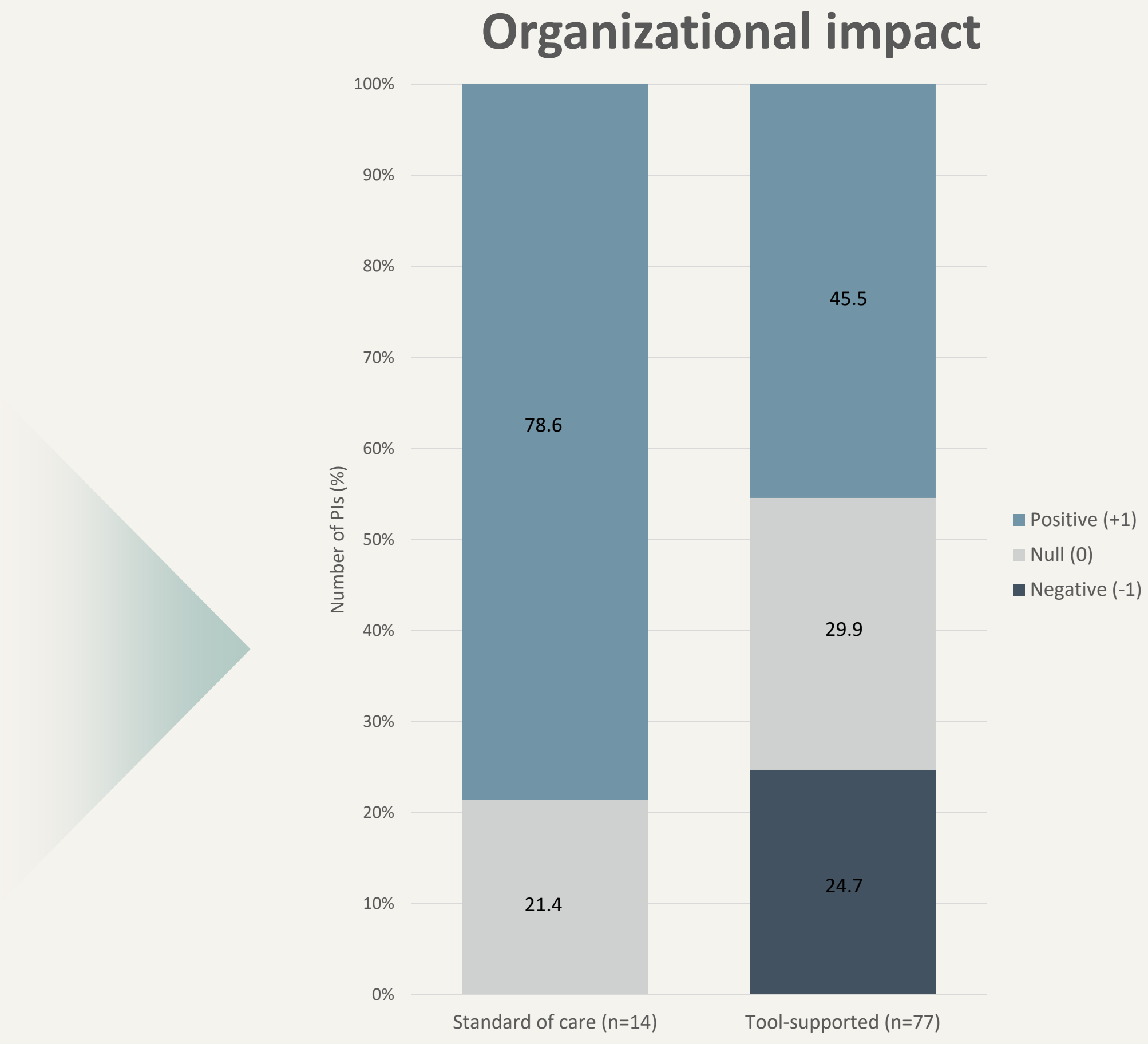
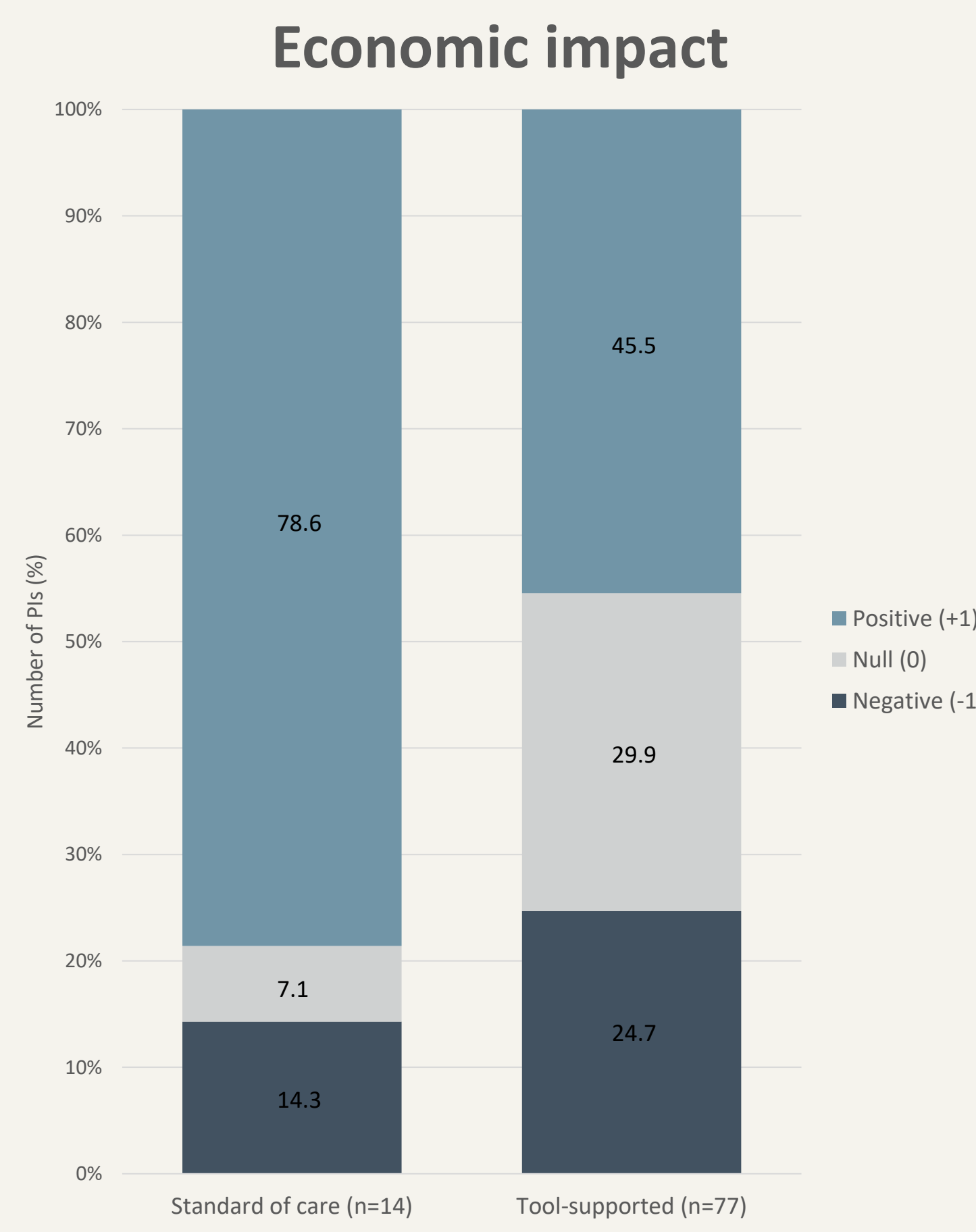
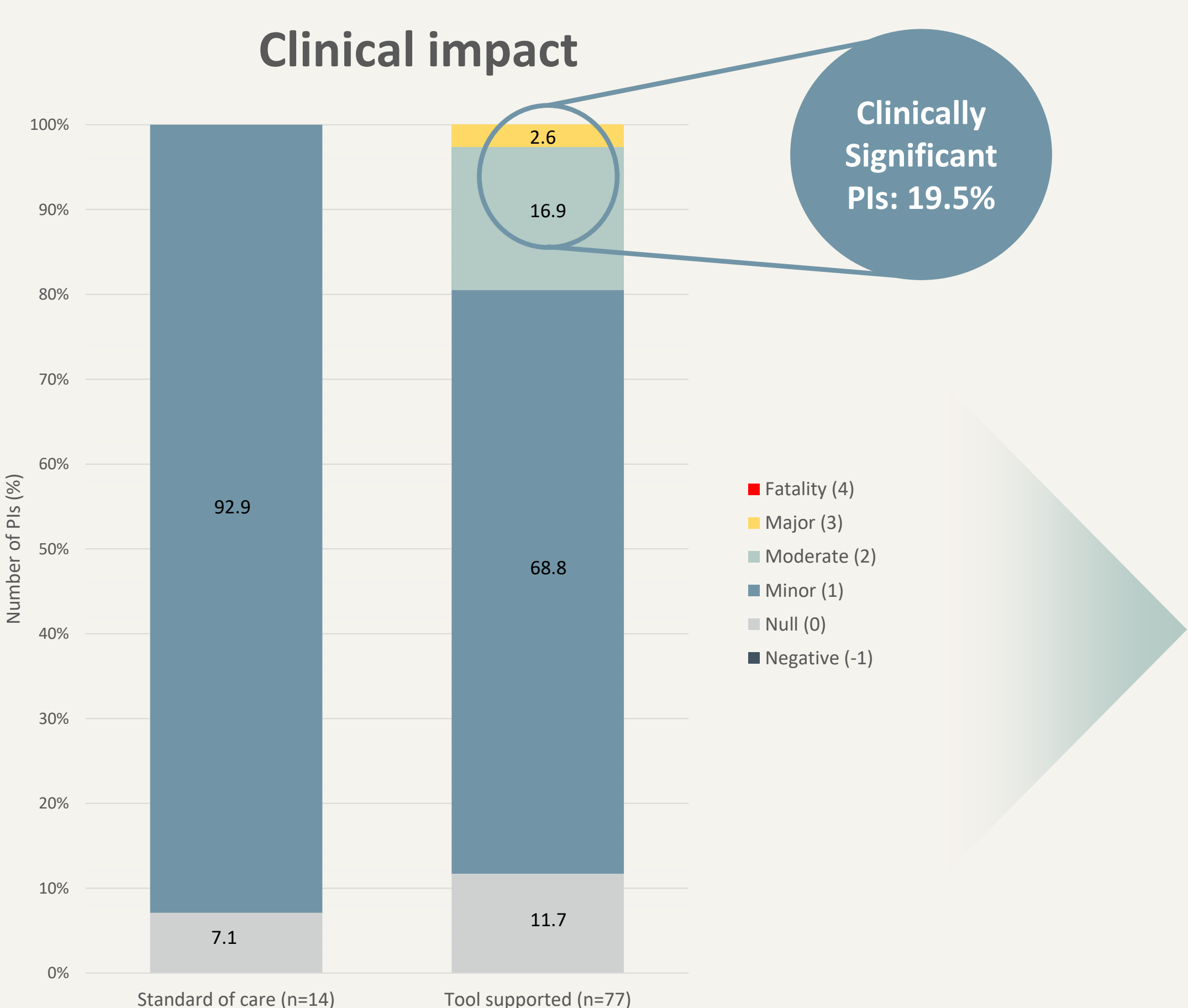
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- DRP and PI Registration:** Be-CLIPSS (Belgian CLInical Pharmacy regiStration System)¹
- Impact Assessment:** CLEO[®] tool (Clinical, Economic, Organizational)²
- Expert Panel:** 2 clinical pharmacists + 1 hospital pharmacist (retrospective review)
- Statistics:** Chi-squared, Fisher's exact, Mann-Whitney U ($\alpha = 0.05$, IBM SPSS)

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Results



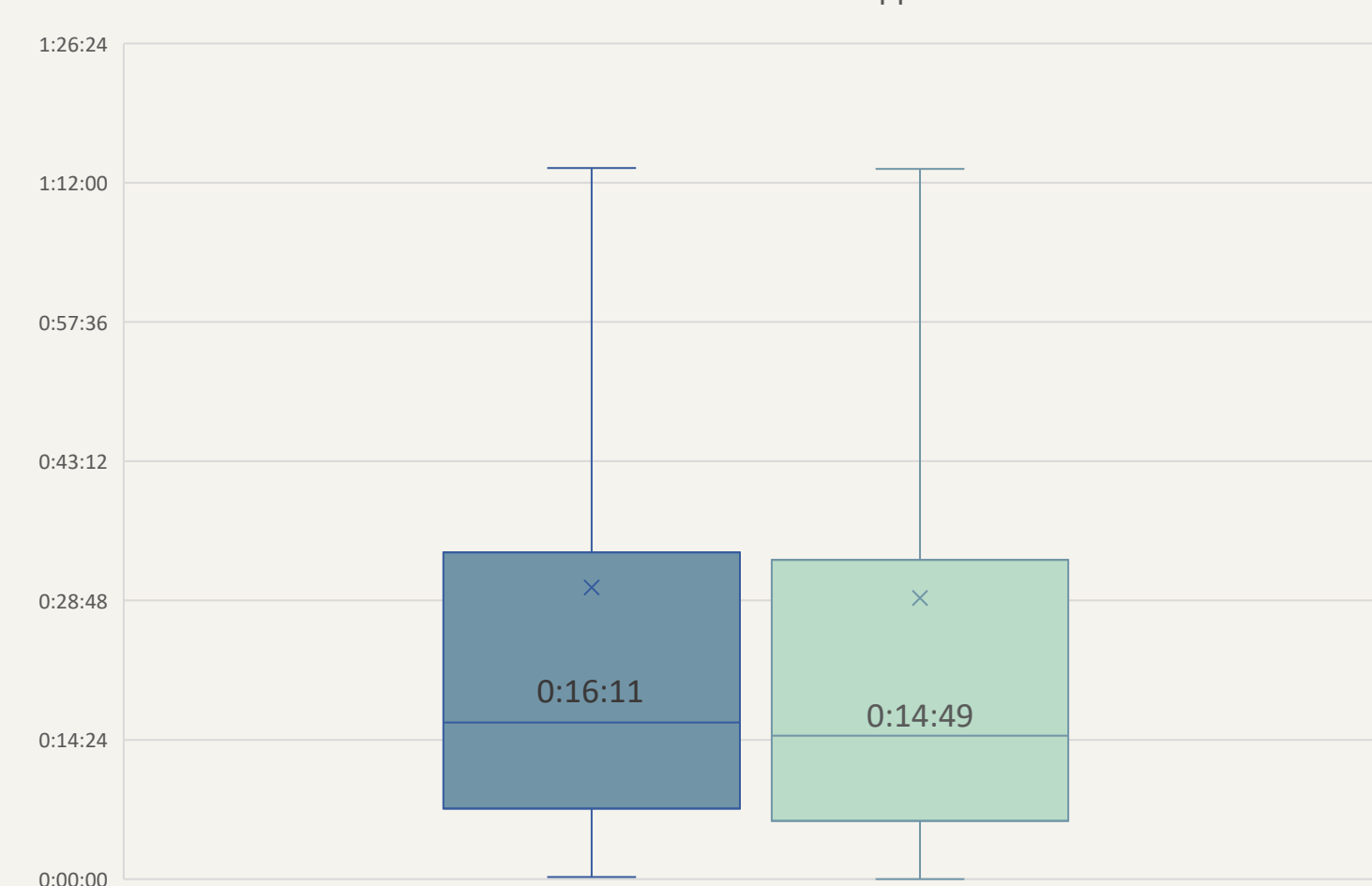
Clinical impact

- Clinically Significant PIs (≥2):**
0% → 19.5%
- Increased detection of clinically relevant PIs
- DRP Detection Rate:**
0.3% → 1.4% ($p < 0.001$)
- Increase in DRP detection

Economic impact

- Total Direct Drug Cost Savings: €7,440 → €105,653**
- Significant cost savings observed across both periods**, driven by:
 - Dose adjustments (optimizing drug dosages)
 - Avoiding duplicate therapies (eliminating unnecessary treatments)

Validation time



Organizational impact

- A shift in organizational impact was observed, but the overall difference between periods was not significant ($p > 0.05$)
- Validation Time: 16:11 → 14:50 ($p < 0.001$)**
- Reduction in validation time, with no impact on cleanroom time management

Discussion

FINDINGS AND IMPLICATIONS

- Increase in DRP detection (from 0.3% to 1.4%): Enhanced ability to identify complex medication errors
- Higher proportion of clinically relevant interventions: Greater effectiveness in detecting critical therapeutic issues
- Substantial direct drug cost savings (€105,653): Demonstrates the economic benefits of systematic validation in chemotherapy
- Reduction in prescription validation time: Improves workflow efficiency without causing delays



Conclusion

The implementation of a structured validation tool for parenteral chemotherapy at the CPU led to significant clinical, economic, and organizational improvements. Overall, the validation tool contributed to **safer, more standardized, and more efficient chemotherapy prescription practices.**

Future studies with larger sample sizes and longer follow-up are needed to confirm long-term clinical and economic impact.

References

- Verheyen S, Steurbaut S, Cortoos PJ, Wuyts SCM. Development and partial validation of Be-CLIPSS: a classification system for hospital clinical pharmacy activities. *Int J Clin Pharm.* 2024;46(1):80–89
- Vo HT, Charpiat B, Chanoine S, et al. CLEO: A multidimensional tool to assess clinical, economic and organisational impacts of pharmacists' interventions. *European Journal of Hospital Pharmacy.* 2021;28:193–200.



LIMITATIONS

- Limited study duration
- Potential underreporting
- Expert-based CLEO[®] scoring introduces subjective elements
- Absence of multidisciplinary scoring panel

Improved detection

Clinical, economical & organizational relevance

Efficiency