

Impact of implementing a structured patient handoff on communication in a pediatrics residency program

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ABSTRACT

Introduction. Patient information transfers between professionals on different shifts are a particularly sensitive area for errors and omissions. Our objective was to evaluate the impact of implementing a structured handover (I-PASS) on data omission in patient information transfers between pediatric residents.

Population and methods. The study was conducted in a public hospital in the province of Salta, Argentina, from November 14, 2020, to December 14, 2020 (pre-intervention) and from March 15, 2021, to April 15, 2021 (post-intervention). The design was quasi-experimental, before-and-after, uncontrolled. Pre- and post-intervention shift handovers were evaluated. The intervention included training resident physicians in a structured handover using the mnemonic rule I-PASS, teamwork training, and digitized written handover. The quality of the handover was evaluated through direct observation.

Results. There were 233 pre-intervention and 245 post-intervention evaluations. The pre- and post-intervention comparison showed a significant improvement in most key handover data. Distractions were reduced from 40.8% to 24.1% ($p = 0.001$); communication of severity increased from 36.8% to 63.2% ($p = 0.001$).

Conclusion. The introduction of the I-PASS program reduced the omission of sensitive data and interruptions, without prolonging handover duration.

Keywords: communication; shift handover.

doi: <http://dx.doi.org/10.5546/aap.2025-10845.eng>

To cite: Gómez Lund O, Jorro Barón F, García Roig C. Impact of implementing a structured patient handoff on communication in a pediatrics residency program. *Arch Argent Pediatr.* 2025;e202510845. Online ahead of print 13-NOV-2025.

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Funding: None.

Conflict of interest: None.

Received: 8-3-2025

Accepted: 10-1-2025



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INTRODUCTION

Patient safety is an essential aspect of healthcare quality, and healthcare systems must prioritize it.¹ Miscommunication is one of the leading causes of adverse events in hospitals. Hence, optimizing the transfer process is essential for patient safety.² Transfer refers to the process of transferring the role and responsibility of providing care from one person to another, thus ensuring continuity of care;¹ this occurs daily, for example, shift changes or transferring a patient from one location to another in the hospital.

Several studies have reported that there is often little standardization in the process or content of handovers and that most resident physicians receive inadequate formal training,^{3,4} despite the emphasis on its importance by the US National Academy of Medicine, the Accreditation Council for Graduate Medical Education (ACGME), and others.^{5,6}

The length of shifts in some workplaces has been reduced, leading to more handovers between physicians.^{7,8} This situation increases the risk of communication errors.

The I-PASS transfer tool (where **I** means Illness severity; **P**: Patient summary; **A**: Action list; **S**: Situation awareness and contingency planning; and **S**: Synthesis by receiver) is a standardized process for care transitions that emphasizes illness severity and contingency planning, elements that are often missing from handover discussions.⁷ Implementation of I-PASS reduced preventable adverse events by 30% in a study of nine pediatric programs.⁸ Starmer et al. found that implementation of the I-PASS Transfer Program in 32 hospitals was associated with increased inclusion of key transfer data elements, improvements in communication quality, and a significant reduction in reported adverse event rates.⁹

Previous studies have shown that 4 out of 5 transfer sheets contain at least one error; the most common is the omission of medication. In addition, half of the patient transfer documents become inaccurate or obsolete within 6 hours of an average night shift, mainly due to medication changes. By the following morning, only 40% of the documents were still current.¹⁰ Standardizing these documents has the potential to reduce the omission of key data during patient care transitions, which may decrease the risk of subsequent medical errors.¹¹

In 2006, the Joint Commission International established the requirement to implement a standardized handover approach.¹²

To date, several studies have been conducted in our country to evaluate programs aimed at improving handovers.^{1,13,14} The objective of this study was to evaluate the impact of implementing a standardized medical handover system (I-PASS) on the quality of information transmitted during medical handovers between residents in a pediatric ward.

POPULATION AND METHODS

The study was conducted in the Pediatric Clinic Service of a public institution between November 14, 2020, and December 14, 2020 (pre-intervention), and from March 15, 2021, to April 15, 2021 (post-intervention). Pediatric residents share patient care with the physicians responsible for the service. Handoffs took place at 8:00 a.m. and 8:00 p.m., Monday through Friday, and at 8:00 a.m. on weekends, in a room reserved exclusively for the on-duty physicians. The study design was a quasi-experimental, before-and-after, uncontrolled design. It was conducted in two stages.

Baseline measurements (first stage) were taken from November 14, 2020, to December 14, 2020, and post-intervention measurements (second stage) were taken from March 15, 2021, to April 15, 2021. During the pre-intervention, observations of verbal and written handovers were made without intervention. During the observation, a verification tool with 15 key points was used (*Appendix*). This form was used to determine whether the oral and written handover included all aspects concerning an adequate transfer, in addition to the correct identification of the patient, whether there were distractions or interruptions, and the measures used to minimize them (closing the door while the handover was taking place, placing a sign on the door to alert that the handover was taking place, disconnecting the telephone after notifying the nursing staff, and assigning a person in charge of emergencies, placing cell phones in a separate area and on silent mode, etc.) and the duration of the handover for each patient. To this end, the variables were defined operationally as follows:

- **Duration:** the time taken to transfer information between healthcare professionals, expressed in minutes and seconds. This is the time spent on each patient.
- **Identification:** refers to whether the data that allows the patient's affiliation to be verified (full name and surname, medical record number) was recorded.

- **Distractions:** interruptions and elements that divert attention during important communication, such as general noise, phone calls, irrelevant conversations, or searching for information, which can lead to the omission of crucial data and affect the quality of patient transfer.
- **Severity:** the degree of compromise of the patient's general condition, as mentioned: mild, moderate, or severe.
- **Diagnoses:** those assigned to the patient referred in the handover.
- **History of the current illness:** key and detailed information about the reason for the consultation, the chronology of symptoms, and treatments received, explained clearly and chronologically (using the patient's own words when possible), and documented in the medical record.
- **Background:** all personal, family, and sociocultural data that form part of the patient's life history.
- **Critical events or complications:** communication failures or errors in the information transmitted that may cause harm to the patient, such as misdiagnosis, failure to address significant symptoms, or inadequate care planning.
- **Access routes:** the presence or absence of any venous or arterial access, its identification in terms of date of placement, as well as the presence of catheters (bladder and/or nasogastric), drains, drainage tubes, etc.
- **Current status:** the patient's clinical condition at the time of information transfer.
- **Tests:** all complementary tests relevant to pathology; their interpretation is recorded, not just the absolute values.
- **Admission date:** the date of admission to the institution.
- **Actions:** all actions to be taken after the transfer, which the sender must explain.
- **Situation:** all actions to be taken in the event of possible health contingencies, as predicted based on the patient's current clinical situation.
- **Summary:** The receiving physician provides an adequate summary of the patient once the transfer between professionals has been completed.

Data collection was carried out by the instructors and resident supervisors involved, who received practical training at the institution, teamwork training, and training in improving the written handover through digitization. Part

of the training was assisted by audiovisual resources shared by Dr. García Roig. The quality of the handover was evaluated through direct observation.

For one month, two rounds were conducted daily (at 8:00 a.m. and 8:00 p.m.) for one week. The same pattern was repeated every seven days.

Statistical analysis

The data was collected in an Excel database. Continuous variables were reported as means and standard deviations, or medians and interquartile ranges, depending on their distribution. Categorical variables were reported as numbers and percentages. To compare continuous variables, the unpaired Student's T-test was used for parametric variables, the Mann-Whitney U test for nonparametric variables, and the chi-square test was used to compare categorical variables. A p -value of <0.05 was considered statistically significant. The data were analyzed using Stata/IC 13.0 for Mac (StataCorp LP™).

Ethical considerations

The Institutional Ethics Committee approved the study and recommended its implementation for the training of all pediatric professionals at the institution (November 9, 2020). Verbal consent was also obtained from all residents who participated in the study.

RESULTS

There were 233 pre-intervention and 245 post-intervention evaluations. The comparison showed a significant improvement in the following data: duration of the pass, 4.8 ± 4.2 minutes pre-intervention and 3.6 ± 2.6 minutes post-intervention. Distractions were reduced from 40.8% to 24.1%. Severity reporting improved from 36.8% to 63.2%. The reporting of placed and functioning lines improved from 34.7% to 57.4%; the date of admission, from 30.9% to 74.3%; situations, from 11.6% to 42%; and actions, from 53.9% to 82.9%. As an exception, it was observed that, in the summary of the patient's illness, there was poor compliance in both periods (*Table 1*).

DISCUSSION

Our study showed improvements in handovers between resident professionals after implementing structured handovers following the I-PASS methodology. The intervention improved

the transmission of essential data, ensuring the continuity of care for hospitalized patients. Standardization made transfers more efficient and objective, increased the quantity and quality of information transmitted, and highlighted the most critical points. It also significantly reduced transfer time, thereby maximizing the process's efficiency.

Measures to minimize interruptions proved very useful, consistent with previous studies' findings.¹⁵ The successful implementation of the I-PASS collaborative project in multiple settings and the improvement in proven patient safety make it a practical and effective tool.^{16,17}

The substantial reduction in time spent on each handover after implementing the structured handover was perceived as a highly significant aspect in medical residency, particularly given the volume of patients seen daily. Likewise, there was an increase in the reporting of critical events or complications, most likely due to greater attention.

The reduction in handover time did not negatively affect the quality of the information shared. On the contrary, effective summaries improved data accuracy. The implementation of a digitalized handover prevented errors due to illegibility and optimized real-time updates on patient actions and their evolutionary variations, as well as generating a standard discursive and mental model in the residency setting, which allowed this new methodology to be compared with the previous one, still in use by professionals outside the residency.

One of the strengths of our study is that observations were made in all rounds and with

residents from all years involved, incorporating the I-PASS methodology in all ward rounds of the residency.

The main limitation of our study is that it is a single-center study; the design does not allow for causal inference. In addition, it was not possible to achieve an adequate synthesis of the patient, which may have contributed to the improvement in the time spent on each transfer. Another point to highlight is that the structured handover could not be extended to all pediatric services, perhaps due to deeply rooted mental and cultural models that prevent the proven usefulness of a practical, cost-free, and standardized tool for the best care of our patients from being recognized. This is the greatest challenge.

CONCLUSION

The I-PASS tool was successfully adapted to our environment, achieving improvements in transfers, in line with local studies that show substantial gains.^{1,13} The omission of sensitive data and interruptions was reduced, without prolonging the duration of transfers. ■

Acknowledgments

To our residents who accepted the challenge of change.

The supplementary material provided with this article is presented as submitted by the authors. It is available at: https://www.sap.org.ar/docs/publicaciones/archivosarg/2026/10845_AO_Gomez_Lund_Anexo.pdf

TABLE 1. Comparative results of pre- and post-intervention handover observations

	Pre-intervention (n = 233)	Post-intervention (n = 245)	p-value
Duration, minutes	4.8 ± 4.2	3.6 ± 2.6	0.001
Identification	231/233 (99.1%)	244/245 (99.6%)	0.533
Distractions	93/228 (40.8%)	59/245 (24.1%)	0.001
Severity	120/220 (36.8%)	206/244 (63.2%)	0.001
Diagnosis	221/233 (94.8%)	244/245 (99.6%)	0.001
Current medical history	117/221 (52.9%)	153/233 (65.7%)	0.006
History	105/214 (49.1%)	125/230 (54.3%)	0.266
Critical events	112/228 (49.1%)	161/239 (67.4%)	0.001
Access routes	76/219 (34.7%)	139/242 (57.4%)	0.001
Current status	215/232 (92.7%)	238/245 (97.1%)	0.026
Medical studies	170/229 (74.2%)	184/241 (76.3%)	0.595
Medications	143/228 (62.7%)	195/245 (79.6%)	0.001
Date of admission	67/217 (30.9%)	182/245 (74.3%)	0.001
Actions	125/232 (53.9%)	203/245 (82.9%)	0.001
Status	27/233 (11.6%)	103/245 (42%)	0.001
Summary	3/232 (1.3%)	0/245 (0%)	0.074

REFERENCES

- Jorro Barón F, Díaz Pumara C, Tittarelli MAJ, Raimondo A, Urtasun M, Valentini L. Improved handoff quality and reduction in adverse events following implementation of a Spanish-language version of the I-PASS bundle for pediatric hospitalized patients in Argentina. *J Patient Saf Risk Manag*. 2020;25(6):225-32. doi: 10.1177/2516043520961708.
- Starmer AJ, Spector ND, Srivastava R, Allen AD, Landrigan CP, Sectish TC, et al. I-pass, a mnemonic to standardize verbal handoffs. *Pediatrics*. 2012;129(2):201-4. doi: 10.1542/peds.2011-2966.
- Horwitz LI, Krumholz HM, Green ML, Huot SJ. Transfers of patient care between house staff on internal medicine wards: a national survey. *Arch Intern Med*. 2006;166(11):1173-7. doi: 10.1001/archinte.166.11.1173.
- Vidarthi AR, Arora V, Schnipper JL, Wall SD, Wachter RM. Managing discontinuity in academic medical centers: strategies for a safe and effective resident sign-out. *J Hosp Med*. 2006;1(4):257-66. doi: 10.1002/jhm.103.
- O'Toole JK, Stevenson AT, Good BP, Guiot AB, Solan LG, Tse LL, et al. Closing the gap: a needs assessment of medical students and handoff training. *J Pediatr*. 2013;162(5):887-8.e1. doi: 10.1016/j.jpeds.2013.01.045.
- Sectish TC, Starmer AJ, Landrigan CP, Spector ND; I-PASS Study Group. Establishing a multisite education and research project requires leadership, expertise, collaboration, and an important aim. *Pediatrics*. 2010;126(4):619-22. doi: 10.1542/peds.2010-1793.
- Nasca TJ, Day SH, Amis ES Jr; ACGME Duty Hour Task Force. The new recommendations on duty hours from the ACGME Task Force. *N Engl J Med*. 2010;363(2):e3. doi: 10.1056/NEJMsb1005800.
- DeRienzo CM, Frush K, Barfield ME, Gopwani PR, Griffith BC, Jiang X, et al. Handoffs in the era of duty hours reform: a focused review and strategy to address changes in the Accreditation Council for Graduate Medical Education Common Program Requirements. *Acad Med*. 2012;87(4):403-10. doi: 10.1097/ACM.0b013e318248e5c2.
- Starmer AJ, Spector ND, O'Toole JK, Bismilla Z, Calaman S, Campos ML, et al. Implementation of the I-PASS handoff program in diverse clinical environments: A multicenter prospective effectiveness implementation study. *J Hosp Med*. 2023;18(1):5-14. doi: 10.1002/jhm.12979.
- Rosenbluth G, Jacolbia R, Milev D, Auerbach AD. Half-life of a printed handoff document. *BMJ Qual Saf*. 2016;25(5):324-8. doi: 10.1136/bmjqs-2015-004585.
- Rosenbluth G, Bale JF, Starmer AJ, Spector ND, Srivastava R, West DC, et al. Variation in printed handoff documents: Results and recommendations from a multicenter needs assessment. *J Hosp Med*. 2015;10(8):517-24. doi: 10.1002/jhm.2380.
- Joint Commission Center for Transforming Healthcare releases targeted solutions tool for hand-off communications. *Jt Comm Perspect*. 2012;32(8):1, 3.
- Jorro-Barón F, Suarez-Anzorena I, Burgos-Pratx R, De Maio N, Penazzi M, Rodríguez AP, et al. Handoff improvement and adverse event reduction program implementation in pediatric intensive care units in Argentina: a stepped-wedge trial. *BMJ Qual Saf*. 2021;30(10):782-91. doi: 10.1136/bmjqs-2020-012370.
- Shahian D. I-PASS handover system: a decade of evidence demands action. *BMJ Qual Saf*. 2021;30(10):769-74. doi: 10.1136/bmjqs-2021-013314.
- Starmer AJ, Sectish TC, Simon DW, Keohane C, McSweeney ME, Chung EY, et al. Rates of medical errors and preventable adverse events among hospitalized children following implementation of a resident handoff bundle. *JAMA*. 2013;310(21):2262-70. doi: 10.1001/jama.2013.281961.
- Starmer AJ, Spector ND, West DC, Srivastava R, Sectish TC, Landrigan CP, et al. Integrating research, quality improvement, and medical education for better handoffs and safer care: disseminating, adapting, and implementing the I-PASS program. *Jt Comm J Qual Patient Saf*. 2017;43(7):319-29. doi: 10.1016/j.jcjq.2017.04.001.
- Starmer AJ, Spector ND, Srivastava R, West DC, Rosenbluth G, Allen AD, et al. Changes in medical errors after implementation of a handoff program. *N Engl J Med*. 2014;371(19):1803-12. doi: 10.1056/NEJMsa1405556.