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# Health Literacy and Clear Bedside Communication: A Curricular Intervention for Internal Medicine Physicians and Medicine Nurses

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## Abstract

**Introduction:** Communication remains the backbone of patient-provider relationships, and many health outcomes have been directly attributed to both effective and ineffective communication. We developed an educational intervention to improve bedside communication and increase use of health literacy principles, in part as a response to suboptimal inpatient satisfaction scores. **Methods:** Our intervention consisted of a bedside communication curriculum among 37 attending medicine physicians, 76 internal medicine residents, and 85 bedside nurses. The 1- to 1.5-hour curriculum included a didactic session to teach health literacy principles, video demonstrations, group discussion, and role-play. Attending physicians' health literacy knowledge, attitudes, and confidence were evaluated using pre- and postsurveys. Evaluation of the curriculum included Likert-type questions and free-text responses. **Results:** Attending physicians' knowledge and confidence improved (74% correct pre, 100% correct post,  $p < .001$ ; 4.41 pre, 4.68 post,  $p = .002$ , respectively). Certain attitude domains also improved, including importance of team introductions and nurse contributions to bedside rounds ( $p < .001$ ). Both residents and nurses found the curriculum valuable and planned to incorporate it into their bedside rounding. **Discussion:** A brief, low-cost curricular intervention focusing on clear communication skills and health literacy principles resulted in significant improvements in knowledge and attitudes of attending physicians and was readily incorporated by resident physicians and nurses. This curriculum can be easily implemented in a variety of settings to improve bedside patient-physician communication.

## Keywords

Health Literacy, Patient Experience, Clear Communication, Bedside Communication, Multidisciplinary Education

## Appendices

- A. Health Literacy Didactic .pptx
- B. Bedside Round Video 1 .mp4
- C. Bedside Round Video 2 .mp4
- D. Bedside Round Video 3 .mp4
- E. Bedside Round Video 4 .mp4
- F. Discharge Video 1.mp4
- G. Discharge Video 2.mp4
- H. Facilitator Guides.docx
- I. Presurvey.docx
- J. Postsurvey.docx
- K. Answer Key.docx

*All appendices are peer reviewed as integral parts of the Original Publication.*

## Educational Objectives

By the end of this activity, learners will be able to:

1. Identify health literacy as a barrier to patient-provider communication.
2. Cite the frequency, define the prevalence, and explain the implication of low health literacy in the average patient population.
3. Utilize health literacy universal precautions and apply evidence-based communication skills to improve translation of health care information at the bedside.

## Introduction

In an effort to continually improve health outcomes for hospitalized patients, hospital systems seek to address the multifactorial causes associated with patient outcomes, including health literacy<sup>1</sup> and patient communication.<sup>2</sup> Effective and clear physician-patient communication is imperative to achieve and maintain therapeutic relationships, and patients value physicians who take time to listen and provide clear plans of care.<sup>3</sup> Similarly, nurse-patient communication is a well-documented facilitator of patient-centered care.<sup>4</sup> A major barrier to clear communication is poor health literacy, which is highly prevalent across diverse settings. Over 85% of patients feel their health literacy is poor,<sup>5</sup> and data clearly demonstrate that

these patients are at increased risk for adverse outcomes, including more frequent hospitalizations, poorer preventive health care and overall health status, and higher mortality rates.<sup>1,6</sup> A key and generalizable strategy to reduce the impact of low health literacy is to improve patient-provider communication.

Reports issued by the American Medical Association and the Institute of Medicine call for greater efforts to educate health care professionals about low levels of health literacy and to provide evidence-based techniques for effective communication with the many patients in this category.<sup>7,8</sup> For instance, prior research has shown that internal medicine residents and attendings rarely consider health literacy when providing patient care,<sup>9</sup> commonly overestimate patients' literacy levels,<sup>10</sup> may feel ineffective in communicating clearly with low-literacy patients,<sup>11</sup> and infrequently use clear health communication techniques.<sup>12-14</sup> Deficiencies in health literacy knowledge and communication techniques also exist in the nursing literature.<sup>15-17</sup> Despite a clear educational need, there have been few curricula published in this area. Furthermore, unlike the present study, the few prior publications describing health literacy curricula have usually focused on a single discipline<sup>18-20</sup> and/or have not examined patient-level outcomes.<sup>19-22</sup>

In an effort to improve bedside communication and the overall patient experience, we designed and implemented a curriculum for medicine inpatient attendings, internal medicine resident physicians, and bedside medicine nurses focusing on teaching clear communication skills to be used as a universal precaution for optimizing patients' understanding of their medical care.

## Methods

### Project Design, Setting, and Participants

We utilized a pre-/poststudy design to assess the curriculum's effectiveness. The curriculum was implemented in June 2016 at the University of Pittsburgh Medical Center Presbyterian/Shadyside Hospitals, a large, academic, tertiary care hospital. Thirty-seven inpatient attending physicians, 76 internal medicine and medicine-pediatric postgraduate year 2 (PGY 2), PGY 3, and PGY 4 residents, and 85 nurses participated. The curriculum was delivered to attending physicians at two different hour-long preexisting faculty development meetings, to residents at one 90-minute workshop, and to nurses in one of 10 separate meal-hour conferences. The study was approved by the university's Quality Improvement (QI) Committee, which works in close conjunction with the Institutional Review Board (IRB). The QI Committee deemed that our project clearly met the criteria for a QI project and thus did not need IRB approval to be implemented.

### Curriculum Development and Implementation

The content was developed and taught by the authors, who include communication experts and clinician educators within the Department of Medicine. The curriculum, focused on evidence-based principles from the health literacy literature,<sup>20,23,24</sup> utilized adult learning practices and consisted of three components: a brief didactic PowerPoint presentation, videos, and role-play. The didactic session taught concrete communication skills, including how to best avoid jargon, to use the teach-back method,<sup>25,26</sup> to give only one to three points of information to the patient at a time,<sup>23</sup> and to utilize the phrase "What questions do you have?" at the end of patient encounters (Appendix A).<sup>20,27</sup> Six video demonstrations of bedside rounds and bedside discharges were recorded and edited professionally (Appendices B-G). Each video demonstration consisted of a subpar version and an effective version of a bedside encounter. These reenacted scenarios were based on actual patient encounters that had been previously audiotaped with the permission of the patient. We then transcribed these encounters into scripts after removing any patient-identifying information. The scripts were acted by volunteer medicine service nurses and graduating residents who were not involved in the study. During curricular sessions, the videos were shown to participants. After each video segment, curriculum facilitators paused to discuss what skills they had observed, what could have been improved, and what had gone well. Each effective video included one or more key health literacy communication techniques that the residents were asked to identify. Finally, three role-play scenarios based on common inpatient medicine patient encounters were developed as a tool for real-time communication skills practice (Appendix H).

The curriculum was endorsed and advertised by leadership from the internal medicine division, the residency program, and nursing leadership to encourage participation and buy-in. The attending physicians who participated in the curriculum were exposed to both the didactic component (Appendix A) and one bedside rounding video (Appendix C) during one of two 1-hour faculty meetings. Both meetings occurred in a conference room, with the group discussion held between ~20 physicians.

The internal medicine residents who participated in the curriculum were exposed to the didactic component, four video demonstrations of bedside rounds (Appendices B-E), and the role-play scenarios. The resident curriculum was delivered as a 90-minute workshop, offered on two separate dates to accommodate schedules. The residents first met as a large group in an auditorium for the didactic PowerPoint presentation (Appendix A) and viewed and debriefed one video demonstration of bedside rounds (Appendix B). They then broke into small groups of eight to 10 with one of five faculty facilitators to view each of the remaining three video demonstrations of bedside rounds (Appendices C-E). After that, the residents were grouped into pairs or trios to role-play the communication skills they had learned using the written case scenarios (Appendix H). Finally, back in their groups of eight to 10, the residents participated in a group discussion about difficulties that arise in translating complicated medical information to all patients, as well as those with low health literacy.

The medicine unit nurses participated in the curriculum and were exposed to both the didactic component (Appendix A) and two bedside discharge videos (Appendices F & G) during one of 10 hour-long conferences for the nurses led by a single nurse educator. This educator had been trained in the curriculum prior to the sessions. These workshops also included time for small-group discussion and debriefing as each session had approximately 10-12 nurses. Nurses chose one time and date based purely on their clinical schedule. A facilitator guide outlining the best practices for all of the sessions can be found in Appendix H.

#### Curriculum Evaluation

We evaluated the curriculum with surveys administered to all participants electronically before (Appendix I) and immediately after (Appendix J) each educational session, using the REDCap<sup>28</sup> platform. These surveys assessed changes in knowledge, attitudes, and confidence. A knowledge score was determined by results of a multiple-choice health literacy quiz developed from health literacy best practices (answers in Appendix K).<sup>1,5,29</sup> Attitudes toward the communication principles taught were assessed using a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*). Confidence in communication skill was also measured with a 5-point Likert scale (1 = *not at all confident*, 5 = *very confident*).

Resident and nurse satisfaction with the curriculum was also assessed in the postsurvey (Appendix J). This assessed the appropriateness of the training based on the respondents' level, the usefulness of each curricular component, and the respondents' likelihood of adopting a skill taught in the workshop to their practice on a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*). Data were collected and managed using REDCap.

#### Statistical Analysis

Summary statistics were performed to calculate mean scores for all items. Knowledge, attitudes, and confidence of the attendings from matched pre- and postsurveys were analyzed using a Wilcoxon signed rank test (S value), chi-square tests, and Fisher's exact test. All statistical analyses were performed using Stata 15 (College Station, TX).

## Results

#### Participation and Response Rates

A total of 37 out of 52 invited faculty attendings (71%) participated in the curriculum. Of those, 100% completed both the pre- and postsurveys. A total of 76 out of 112 invited medicine residents (68%) participated in the curriculum. Of those, 96% completed both the pre- and postsurveys. A total of 85 out of

120 invited medicine unit nurses (71%) participated in the curriculum, 100% of whom completed both the pre- and postsurveys.

#### Change in Knowledge and Attitudes

The 37 attending physicians who participated in the curriculum showed a significant improvement in their knowledge (74% correct pre, 100% correct post,  $p < .001$ ), which included identifying health literacy as a barrier to good patient-provider communication and citing the frequency of low health literacy in an average patient population. The change in confidence (4.41 pre to 4.68 post,  $S = 27.5$ ,  $p = .002$ ) was significant, as were attitudinal changes including introducing oneself and all team members by name and role (4.19 to 4.43,  $S = 22.5$ ,  $p = .0039$ ) and asking for nurse contributions to bedside rounds (4.41 to 4.73,  $S = 39.0$ ,  $p = .005$ ). There was no significant change in the importance of translating the plan into plain language to improve the patient's care (4.76 to 4.97,  $S = 7.5$ ,  $p = .063$ ) or patient satisfaction (4.73 to 4.86,  $S = 7.5$ ,  $p = .063$ ).

As we have described in previous publications,<sup>30-32</sup> this curriculum also assessed change in resident and nurse knowledge ( $p < .001$ ), confidence (nurse only,  $p < .001$ ), attitudes ( $p < .001$ ), and objective bedside skills (for three domains,  $p < .001$ ), as well as patient satisfaction (overall improvement of 4-14 points on the Hospital Consumer Assessment of Healthcare Providers and Systems scale). Improvements were seen in each of these domains, showing that the learners utilized the health literacy universal precautions to better communicate with their patients.

#### Satisfaction With Curriculum

Residents were overall very satisfied with the curriculum, finding value in all parts of it: Seventy-eight percent felt the videos were helpful, while 68% felt the role-play was useful. Ninety percent of the residents stated that the session increased their comfort in bedside communication, and 91% stated that the information was at the appropriate level. Ninety-nine percent of residents thought they would use a suggested communication skill from the workshop in their clinical practice.

Nurses similarly found the curriculum valuable: Eighty-one percent felt that the session was appropriate for their needs, and 80% noted that it increased their comfort in bedside communication. Additionally, 79% rated the videos as helpful, and 97% reported that they planned to use a demonstrated communication technique in their clinical practice.

## Discussion

Our results demonstrate that a brief clear communication curriculum focused on health literacy improved knowledge and attitudes among attending physicians and was deemed valuable by both internal medicine residents and nurses.

A strength of our curriculum was its use of adult learning principles to optimize curricular impact.<sup>33</sup> These principles included experiential learning, feedback, and diverse educational methods.<sup>34,35</sup> Specifically, we gained buy-in as to relevance to our audience by outlining the evidence that clear communication and recognition of health literacy improve patient care and outcomes. Second, we used lectures, videos, and role-play opportunities to engage all learners actively and reinforce the principles during each step. Additionally, the demonstration of real-world examples and objective skills gave participants the opportunity to practically apply their new skills. Our previously published outcomes<sup>30,31</sup> have demonstrated that improvements in knowledge and attitudes translate to improved bedside communication skills and ultimately to an improved patient experience.

An important lesson learned while developing and implementing the curriculum was the necessity of stakeholder buy-in for this large multidisciplinary undertaking. Our focus on the wealth of evidence showing that patient outcomes and the patient experience are impacted by use of clear communication and health literacy principles was vital in achieving the support required for this intervention. Once buy-in

was established from residency, nursing, and attending physician leadership, participants' engagement was readily achieved. Additionally, the minimal time investment and the applicability of health literacy principles to all types of providers made this curriculum easy to implement with both early and seasoned physicians and nurses caring for patients at the bedside, with little or no need to modify curricular content.

Finding time to deliver the curriculum to nurses was more difficult than doing so for attendings and residents as, in our and likely most institutions, few options exist to cover nurses' responsibilities during the workday. For this reason, we held many nursing sessions over a mealtime to minimize nurses' time away from patient care. Furthermore, we purposefully abbreviated the curriculum delivered to nurses and attending physicians, compared to that delivered to residents, to facilitate attendance and engagement. Of note, the curriculum was delivered at preexisting faculty meetings. Despite these efforts, a portion of attendings, residents, and nurses did not participate, which may have lessened the overall curricular impact. For the residents, we were able to offer the curriculum twice in consecutive months, so that nearly all residents could attend while on elective. The only residents unable to make one of these sessions were those who had vacation or night-float rotation conflicts.

Some limitations of our intervention include that the curriculum was delivered to internal medicine providers at a single large academic center. Though our center is comparable in size and structure to many academic medical centers and faces the same struggles with patient satisfaction and frequent low health literacy, the generalizability of our findings may be limited across institutions or disciplines. Another limitation is that our pre-/postsurveys testing knowledge and attitudes have not been validated, although they were developed based on previous work. A final limitation is that we were unable to assess whether there was any behavior change among attending physicians who participated.

Given the positive results and ease of delivery of our curriculum, we have made efforts to embed it in ongoing educational initiatives at our institution. The curriculum is now part of our onboarding for new inpatient medicine attendings and new medicine unit nurses. At the resident level, it is delivered during our annual leadership and teaching retreat for all PGY 2 internal medicine residents, and portions are included in the monthly orientation to the general medicine wards rotation. Further dissemination to other service lines and to affiliated hospitals is underway. Because of the multidisciplinary implications of this curriculum, it can be easily targeted to almost any type of health care provider or service that offers patient care at the bedside. To fully impact the patient experience throughout an entire unit, hospital, or health care system, the curriculum ideally should be adapted to all medical subspecialties spanning both the inpatient and outpatient arenas, including surgeons, medical subspecialty consultants, and the emergency department. Some small adjustments to the curriculum, utilizing the framework provided, may be necessary to achieve this goal, depending on the institution.

Overall, our results demonstrate that a health literacy curriculum delivered to nurses and resident and attending physicians significantly improved knowledge and attitudes. The curriculum requires minimal time and cost investment, and the results are widely generalizable to help achieve the universal goal of improving patient-provider communication.

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#### Informed Consent

All identifiable persons in this resource have granted their permission.

#### Prior Presentations

Spagnoletti CL, Allenbaugh J, Corbelli JA, Rack L. "What did they say?" An innovative curriculum for teaching medicine residents and nurses how to use health literacy principles to better communicate with patients at the bedside. Presented at: Press Ganey National Client Conference; November 2, 2017; Orlando, FL.

#### Ethical Approval

Reported as not applicable.

#### References

1. Berkman ND, Sheridan SL, Donahue KE, Halpern DJ, Crotty K. Low health literacy and health outcomes: an updated systematic review. *Ann Intern Med.* 2011;155(2):97-107. <https://doi.org/10.7326/0003-4819-155-2-201107190-00005>
2. Street RL Jr, Makoul G, Arora NK, Epstein RM. How does communication heal? Pathways linking clinician–patient communication to health outcomes. *Patient Educ Couns.* 2009;74(3):295-301. <https://doi.org/10.1016/j.pec.2008.11.015>
3. Quigley DD, Elliott MN, Farley DO, Burkhart Q, Skootsky SA, Hays RD. Specialties differ in which aspects of doctor communication predict overall physician ratings. *J Gen Intern Med.* 2014;29(3):447-454. <https://doi.org/10.1007/s11606-013-2663-2>
4. McCabe C. Nurse–patient communication: an exploration of patients' experiences. *J Clin Nurs.* 2004;13(1):41-49. <https://doi.org/10.1111/j.1365-2702.2004.00817.x>
5. Rudd RE. Health literacy skills of U.S. adults. *Am J Health Behav.* 2007;31(suppl 1):S8-S18.
6. DeWalt DA, Berkman ND, Sheridan S, Lohr KN, Pignone MP. Literacy and health outcomes: a systematic review of the literature. *J Gen Intern Med.* 2004;19(12):1228-1239. <https://doi.org/10.1111/j.1525-1497.2004.40153.x>
7. Kirsch IS, Jungeblut A, Jenkins L, Kolstad A. *Adult Literacy in America: A First Look at the Findings of the National Adult Literacy Survey.* 3rd ed. Washington, DC: National Center for Educational Statistics; 2002. NCES 1993-275.
8. Ad Hoc Committee on Health Literacy for the Council on Scientific Affairs, American Medical Association. Health literacy: report of the Council on Scientific Affairs. *JAMA.* 1999;281(6):552-557. <https://doi.org/10.1001/jama.281.6.552>
9. Powell CK, Kripalani S. Resident recognition of low literacy as a risk factor in hospital readmission. *J Gen Intern Med.* 2005;20(11):1042-1044. <https://doi.org/10.1111/j.1525-1497.2005.0220.x>
10. Bass PF III, Wilson JF, Griffith CH, Barnett DR. Residents' ability to identify patients with poor literacy skills. *Acad Med.* 2002;77(10):1039-1041.
11. Seligman HK, Wang FF, Palacios JL, et al. Physician notification of their diabetes patients' limited health literacy: a randomized, controlled trial. *J Gen Intern Med.* 2005;20(11):1001-1007. <https://doi.org/10.1111/j.1525-1497.2005.00189.x>
12. Deuster L, Christopher S, Donovan J, Farrell M. A method to quantify residents' jargon use during counseling of standardized patients about cancer screening. *J Gen Intern Med.* 2008;23(12):1947-1952. <https://doi.org/10.1007/s11606-008-0729-3>
13. Farrell MH, Kuruville P, Eskra KL, Christopher SA, Brienza RS. A method to quantify and compare clinicians' assessments of patient understanding during counseling of standardized patients. *Patient Educ Couns.* 2009;77(1):128-135. <https://doi.org/10.1016/j.pec.2009.03.013>
14. Howard T, Jacobson KL, Kripalani S. Doctor talk: physicians' use of clear verbal communication. *J Health Commun.* 2013;18(8):991-1001. <https://doi.org/10.1080/10810730.2012.757398>
15. Macabasco-O'Connell A, Fry-Bowers EK. Knowledge and perceptions of health literacy among nursing professionals. *J Health Commun.* 2011;16(suppl 3):295-307. <https://doi.org/10.1080/10810730.2011.604389>
16. Cormier CM, Kotliuk JW. Health literacy knowledge and experiences of senior baccalaureate nursing students. *J Nurs Educ.* 2009;48(5):237-248. <https://doi.org/10.3928/01484834-20090416-02>
17. Jukkala A, Deupree JP, Graham S. Knowledge of limited health literacy at an academic health center. *J Contin Educ Nurs.* 2009;40(7):298-302. <https://doi.org/10.3928/00220124-20090623-01>
18. Green JA, Gonzaga AM, Cohen ED, Spagnoletti CL. Addressing health literacy through clear health communication: a training program for internal medicine residents. *Patient Educ Couns.* 2014;95(1):76-82. <https://doi.org/10.1016/j.pec.2014.01.004>
19. Zoberi K, Everard K, Deckert J, Frankenstein L. Health literacy for clerkship students. *MedEdPORTAL.* 2008;4:732. [https://doi.org/10.15766/mep\\_2374-8265.732](https://doi.org/10.15766/mep_2374-8265.732)
20. Kripalani S, Jacobson KL, Brown S, Manning K, Rask KJ, Jacobson TA. Development and implementation of a health literacy training program for medical residents. *Med Educ Online.* 2006;11(1):4612. <https://doi.org/10.3402/meo.v11i.4612>
21. Howley L, Peterson C, Barrett E, Gazewood J, Wilson W, Holroyd S. Utilizing standardized patients to enhance health literacy communication skills. *MedEdPORTAL.* 2008;4:1101. [https://doi.org/10.15766/mep\\_2374-8265.1101](https://doi.org/10.15766/mep_2374-8265.1101)

22. Limaye S, Hikoyeda N, Yeo G, MacClarence P, Baron AR. Geriatric health literacy workshop. *MedEdPORTAL*. 2013;9:9395. [https://doi.org/10.15766/mep\\_2374-8265.9395](https://doi.org/10.15766/mep_2374-8265.9395)
23. Weiss BD. *Health Literacy: Can Your Patients Understand You?* 2nd ed. Chicago, IL: American Medical Association and American Medical Association Foundation; 2007.
24. Weiss BD. *Health Literacy and Patient Safety: Help Patients Understand—Manual for Clinicians*. 2nd ed. Chicago, IL: American Medical Association Foundation and American Medical Association; 2007.
25. Kornburger C, Gibson C, Sadowski S, Maletta K, Klingbeil C. Using “teach-back” to promote a safe transition from hospital to home: an evidence-based approach to improving the discharge process. *J Pediatr Nurs*. 2013;28(3):282-291. <https://doi.org/10.1016/j.pedn.2012.10.007>
26. Kripalani S, Bengtzen R, Henderson LE, Jacobson TA. Clinical research in low-literacy populations: using teach-back to assess comprehension of informed consent and privacy information. *IRB*. 2008;30(2):13-19.
27. DeWalt DA, Brouckson KA, Hawk V, et al. Developing and testing the Health Literacy Universal Precautions Toolkit. *Nurs Outlook*. 2011;59(2):85-94. <https://doi.org/10.1016/j.outlook.2010.12.002>
28. Harris PA, Taylor R, Thielke R, Payne J, Gonzalez N, Conde JG. Research electronic data capture (REDCap)—a metadata-driven methodology and workflow process for providing translational research informatics support. *J Biomed Inform*. 2009;42(2):377-381. <https://doi.org/10.1016/j.jbi.2008.08.010>
29. Kripalani S, Weiss BD. Teaching about health literacy and clear communication. *J Gen Intern Med*. 2006;21(8):888-890. <https://doi.org/10.1111/j.1525-1497.2006.00543.x>
30. Allenbaugh J, Corbelli J, Rack L, Spagnoletti C. A communication intervention aimed at medicine doctors and nurses improves patient satisfaction scores. *J Gen Intern Med*. 2017;32(2)(suppl):S90-S91.
31. Allenbaugh J, Spagnoletti C, Rack L, Corbelli J. “What did they say?” Teaching health literacy and communication skills to internal medicine residents to improve the patient experience. *J Gen Intern Med*. 2017;32(2)(suppl):S644.
32. Allenbaugh J, Corbelli JA, Rack L, Rubio D, Spagnoletti CL. A brief communication curriculum improves resident and nurse communication skills and patient satisfaction. *J Gen Intern Med*. In press.
33. Knowles MS, Holton EF, Swanson RA. *The Adult Learner: The Definitive Classic in Adult Education and Human Resource Development*. 7th ed. Oxford, England: Butterworth-Heinemann; 2011.
34. Kaufman DM. Applying educational theory in practice. *BMJ*. 2003;326(7382):213-216. <https://doi.org/10.1136/bmj.326.7382.213>
35. Reed S, Shell R, Kassis K, et al. Applying adult learning practices in medical education. *Curr Probl Pediatr Adolesc Health Care*. 2014;44(6):170-181. <https://doi.org/10.1016/j.cppeds.2014.01.008>

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