Literacy Promotion Training and Implementation in Pediatric Continuity Clinics

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Abstract

Background: Despite endorsement by the American Academy of Pediatrics, there are no national data on literacy promotion (LP) training and behaviors.

Objective: To describe LP training experiences and behaviors of pediatric and internal medicine/pediatrics residents and faculty nationally, and the association between LP training and behaviors.

Methods: The Academic Pediatric Association's Continuity Research Network and Reach Out and Read National Center sent an online survey to faculty and residents at participating Continuity Research Network clinics. Respondents were asked about LP training experiences and behaviors. Data were analyzed using descriptive statistics, chi-square tests, and logistic regression modeling.

Results: 473 faculty and 1216 residents at 42 institutions participated. More faculty than residents reported completing online Reach Out and Read training (63% vs 45%, $P < .0001$). More residents reported learning in clinic from others (92% vs 89%, $P = .04$). Training experiences did not differ otherwise. More faculty reported providing anticipatory guidance (87% vs 77%, $P < .0001$); modeling shared reading (69% vs 45%, $P < .0001$); and using books for developmental assessment (80% vs 62%, $P < .0001$). Both groups (97%) reported distributing books. The training modality most often endorsed as "very/extremely influential" was learning in clinic from others. Some LP behaviors were associated more strongly with online training while others were associated more strongly with in-person training.

Conclusions: Online training and in-person training are both associated with high quality delivery of LP. Faculty members are more likely to have completed online training and to report engaging in the full range of recommended LP behaviors. These data have implications for LP training.

Keywords: literacy promotion training

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What's New

This study was the result of a collaboration between the Academic Pediatric Association's Continuity Research Network and Reach Out and Read. It is the first national survey to describe literacy promotion training and behavior.

Reach Out and Read (ROR) is a clinic-based program that endorses literacy promotion as an essential component of health supervision. The impact of ROR is predicated on a 3-part model in which, at every routine health care visit for children age 6 months through 5 years, the waiting room provides a literacy rich environment; the primary care clinician counsels parents about the importance of reading aloud and models shared reading; and the child is given a new, developmentally and culturally appropriate book to take home.[1] In addition, while using the book for developmental assessment is not a part of the formal model, it is an informal component of the program (Reach Out and Read National Center Data, unpublished, 2019). This program is currently implemented in more than 6000 primary care practices across the United States (Reach Out and Read National Center Data, unpublished, 2019). Numerous studies have demonstrated that ROR improves children's vocabulary,[2−6] enhances brain development, and contributes to future school success.[2,6−10] Given these outcomes, the American Academy of Pediatrics has stated that provision of literacy promotion (LP) and education through programs like ROR is "an essential component of primary care pediatrics."[1,11]

The success of ROR and its continued expansion are due in part to a strong commitment to pediatric resident education. Many pediatric residency training programs have incorporated ROR into their resident continuity clinics (Reach Out and Read National Center Data, unpublished,

2019). National survey data show that 80% of patients cared for in continuity clinics are covered by Medicaid, and 20% of the parents have less than a high school education.[12] Low income and low parental education predict low levels of reading at home,[13] and children with low literacy skills in early childhood are more likely to perform poorly in school.[14] LP gives residents a practical tool with which to address a critical health disparity affecting their patients.[15] Residents often take these lessons with them into practice, where they establish ROR programs that they maintain throughout their careers.[16,17]

Despite the importance of resident training in LP, little is known about the training residents actually receive and how it relates to their LP behaviors. Since 2010, the ROR National Center has provided an online CME-accredited training which ROR providers are required to complete (Reach Out and Read National Center Data, unpublished, 2019). However, the extent to which residents are exposed to this training and to other potential training modalities is unknown. The purpose of this study is to describe resident and faculty LP training and behaviors, and the association between LP training modalities and LP behaviors at a national level.

METHODS

We conducted an anonymous cross-sectional national survey of pediatric and internal medicine/pediatrics residents and faculty at pediatric practices participating in the Academic Pediatric Association's Continuity Research Network (CORNET), a national research network. CORNET is focused on studying health, health care, and disparities among children and families, particularly the most vulnerable; improving resident education in pediatric continuity practices; and engaging residents in pediatric primary care research. CORNET brings together 123 pediatric residency programs across the United States (approximately 60% of all accredited pediatric residency programs), with over 6000 trainees providing care for more than 1 million pediatric patients.[18] Among CORNET residency program sites, it is estimated that greater than 90% implement ROR (Reach Out and Read National Center Data, unpublished, 2019). This study was approved by the University of Oklahoma Health Sciences Center Institutional Review Board (IRB) for Human Research.

SURVEY

We developed an anonymous electronic REDCap survey to capture data on: participant and site demographics, LP training, the perceived influence of various training modalities, adherence to the ROR model, other ROR experiences (such as fundraising and volunteering), perceptions regarding early literacy efforts, and knowledge regarding ROR. The survey was developed by the research team with input from experts at the ROR National Center, ROR medical advisors and CORNET advisors. The survey included 47 questions with branching logic so that participants answered a subset of questions depending on their self-identified role.

ENROLLMENT

Pediatric residency programs were recruited to participate in this research project via the CORNET Listserv, the Academic Pediatric Association's Listserv, the ROR Provider Listserv, and CORNET presentations at regional and national meetings. All CORNET residency programs were eligible to take part, regardless of whether or not their continuity clinic(s) had ROR. A description of the study was shared via an email sent to each program's designated CORNET contact (eg, residency program director or attending physician). Interested programs first answered an online demographic survey where they provided the number of pediatric residents, internal medicine and pediatrics residents, continuity attending physicians, and ROR champions. Instructions were then sent to the main CORNET contact at each enrolled program with a link for all continuity clinic faculty and residents to complete an anonymous, online survey through REDCap. All continuity clinic faculty and residents at each participating CORNET residency program were invited to complete the survey. Survey invitations to continuity clinic faculty did not distinguish between those who serve as volunteer continuity clinic faculty and those who do not. Survey data were obtained from May 2018 through September 2018.

MEASURES

In this report we are including data from 17 of the 47 questions which comprise the full survey. These questions addressed site and participant demographics, LP training, and LP behaviors (Supplementary Table 1). Other survey questions pertained to perceptions regarding early literacy and knowledge regarding ROR and were outside of the focus of this report.

ANALYSES

Responses were compared between groups defined by whether a respondent was faculty or resident. Those who responded as "intern" on or after July 1, 2018 were treated as a separate group, "new interns," and were excluded from the analyses since they had little opportunity for exposure to ROR training and practice.

We used descriptive statistics to report practice demographics, and respondent demographics for faculty and residents. We used frequencies to report the proportion of faculty and residents selecting a given response for each question on utilization of ROR and ROR training. We used chi-square to test for differences in reported proportions between faculty and residents. We also used chi-square to test for differences between those who reported formal training(s) and those who did not. Formal training (s) were defined as any training other than "learned in clinic from other residents or faculty." We used $P < .05$ or absence of overlapping 95% confidence intervals as the level of significance for all comparisons. A logistic regression model was created for each LP behavior. All training modalities were included in each model as predictors to investigate which training modality was most predictive

of each LP behavior. As most respondents had received more than one training, this also served as a mechanism to produce odds ratios adjusting for all other trainings received. In addition, faculty/resident status was included in each model to adjust for potential confounding, as faculty/resident status was found to be associated with both LP behaviors and training modalities received. Faculty/resident status was also included in each model to investigate whether training modalities or faculty/resident status were more predictive of LP behaviors. These models estimated the odds ratios and their 95% confidence intervals. We quantified the association between each training variable and LP behavior variable as an odds ratio. Location name was included in each model, however, was not found to be a confounder and was thus excluded from the final models. Chi-square tests with significance level less than 0.05 and prevalence proportion and odds ratios (nonoverlapping 95% confidence intervals indicating significance) were used to investigate whether year of residency had any effect on the association between faculty/resident status and LP behaviors. The association between faculty/resident status and LP behaviors did not significantly differ across year of residency, and thusly year of residency was not included in further analyses.

RESULTS

The survey link was sent to a total of 524 faculty and 2244 residents over the 5-month survey period. We received responses from 473 (90%) faculty and 1216 (54%) residents. These respondents came from 42 residency programs representing 36% of all CORNET residency programs reachable at the time of the study. All of these 42 programs were recognized as ROR sites by the ROR National Center. These programs provided resident education at more than 120 individual clinics. Participant demographics are presented in Table 1. The patients served by the respondents were mostly Medicaid participants and most practices were located in an urban setting. Ninety-nine percent of respondents reported that their clinic currently implements ROR.

Faculty were more likely than residents to report having completed the online ROR training (63% vs 45%, $P < .0001$) and less likely than residents to report learning about ROR in clinic from other physicians (89% vs 92%, $P = .04$). There was no difference between the proportion of faculty and residents who reported any of the other training modalities (Table 2). Formal training in continuity clinic was reported by 63% of faculty and 67% of residents ($P = .25$), while 55% of faculty and 52% of residents ($P = .42$) reported formal in-person training. ROR training as a part of grand rounds was reported by 40% of faculty and 36% of residents ($P = .09$), while 46% of faculty and 48% of residents ($P = .58$) reported receiving ROR training from a conference. Very few faculty (3.8%) and residents (4.3%) reported having received no training at all in ROR. Faculty (86%) were more likely than residents (80%) to report receiving any formal training (any training other than "learned in clinic from other residents or faculty") ($P = .0067$). Free text responses provided by respondents regarding ROR training other than the listed training modalities included training during medical school, at other institutions, maintenance of certification projects, webinars, and training DVDs, among others. The proportion of respondents that found in-clinic training from others to be very/extremely influential (67%) was significantly higher than any other training (Table 3).

Implementation of LP also varied among respondents. Most faculty and residents reported book distribution (97%). However, faculty were more likely than residents to report providing literacy-based anticipatory guidance (87% vs 77%, $P < .0001$), modeling shared reading (69% vs 45%, $P < .0001$), and using a book as a tool for developmental assessment (80% vs 62%, $P < .0001$). The reported frequency of performing the following LP Behaviors are outlined in Supplementary Table 2: book provision, literacy based anticipatory guidance provision, modeling of shared reading, and use of the book as a tool

Table 1. Participant and Clinic Demographics as Reported by Survey Respondents

Resident/Faculty Status	n	(%)
Resident	1216	(72.0)
Faculty	473	(28.0)
Residency Type*	**n**	**(%)**
Pediatrics	1064	(88.4)
Internal medicine and pediatrics	140	(11.6)
Residency Year*	**n**	**(%)**
New intern	252	(20.9)
Intern	90	(7.5)
2nd y	394	(32.8)
3rd y	419	(34.9)
4th y	47	(3.9)
Faculty Roles†	**N**	**(%)**
Resident continuity clinic preceptor	352	(74.4)
Resident continuity clinic director	74	(15.6)
Reach out and read champion	69	(14.6)
CORNET contact	34	(7.2)
Other	62	(13.1)
Estimated Percent of Patients With the Following Insurance‡	**Mean%**	**SD**
Medicaid/HMO Medicaid (n = 52)	70.4	22.7
Private (n = 50)	19.7	22.4
S-CHIP (n = 31)	8.8	8.7
Self-pay/uninsured (n = 47)	5.3	7.5
Tricare (n = 24)	1.8	2.4
Other (n = 12)	0.6	1.6
Urban/Rural Status of Program‡	**n**	**(%)**
Urban	54	(79.4)
Suburban	9	(13.2)
Rural	5	(7.4)

CORNET indicates Continuity Research Network; HMO, health maintenance organization.

*Percentages obtained among those who identified as residents.

†Percentages obtained among those who identified as faculty.

‡Percentages obtained among those who identified as Reach Out and Read Champions.

Table 2. Comparison Between Faculty and Resident ROR Training*

ROR Training Modality	Faculty (n = 473) n (%)	Residents (n = 964) n (%)	
Online ROR training	293 (62.6)	433 (45.4)	$P < .0001$
Formal training in continuity clinic	295 (63.4)	637 (66.6)	$P = .25$
Formal in-person training	252 (54.6)	498 (52.3)	$P = .42$
Learned in clinic from other residents or faculty	417 (88.7)	883 (92.2)	$P = .04$
Grand rounds	187 (40.2)	340 (35.6)	$P = .09$
A conference	213 (46.0)	450 (47.6)	$P = .58$
No training	18 (3.8)	41 (4.3)	$P = .70$
Other (n = 29)			

ROR indicates Reach Out and Read.

*Comparisons between faculty and resident training were made using chi-square tests.

for developmental assessment. In addition, faculty were more likely than residents to report that they give the book to the child at the beginning of the visit in accordance with recommendations from the ROR National Center, rather than in the middle or towards the end (61% vs 50%, $P < .0001$). Close to 10% of respondents reported participating as a volunteer reader for ROR or participating in fundraising efforts. There was no difference between the proportion of faculty and residents who reported participating as a volunteer reader for ROR (11% vs 10%, $P = .91$). More faculty than residents reported participating in fundraising activities (21% vs 6%, $P < .0001$). As expected, more faculty than residents had trained residents (69% vs 13%, $P < .0001$) and trained medical students (52% vs 19%, $P < .0001$) in the use of LP. Free text responses provided by respondents regarding ROR participation other than those listed included a wide variety of other activities including book procurement, starting ROR sites, teaching LP, participating in maintenance of certification projects, medical school participation, grant writing, fundraising, and blogging.

With regard to other components of the ROR program, 76% of respondents reported that their ROR program had books in the waiting room; 24% reported having volunteer readers; 24% of programs provided information about local libraries; and 8% provided adult literacy information. More faculty than residents reported that their ROR program had volunteer readers, (35% vs 18%, $P < .0001$), information about local libraries, (34% vs 19%, $P < .0001$), and adult literacy information, (14% vs 5%, $P < .0001$). Free text responses about other components of their ROR program included comments on handouts on literacy based anticipatory guidance, sibling book programs, parent educators, Reach Out and Write, and food programs.

Most faculty and residents reported that a medical provider selects the book for the child at their ROR program (85% and 83% respectively, $P = .36$). Respondents were given the opportunity to provide free text responses to the question "Who selects the book to be given to the child." Free text responses included Child Life personnel, the patient and/or their family, social worker, care coordinator, the ROR champion, clinic secretary, program coordinator, administrator, clinic manager, clinic coordinator, front office staff, resident coordinator, clinic director, administrative assistant, and dietitian. Most faculty and residents (98%) reported that a medical provider gives the book to the child during their health supervision visit. Others who respondents identified as giving the book to the child included the patient's parents or the child themselves when they select the book, a social worker, or a care coordinator.

Those who participated in formal training(s) were more likely than those who did not participate in formal training to distribute books (98% vs 92%, $P < .0001$), provide relevant anticipatory guidance (84% vs 67%, $P < .0001$), model shared reading (58% vs 33%, $P < .0001$), use books as tools for developmental assessment (71% vs 57%, $P < .0001$), and give the book to the child at the beginning of the visit (56% vs 43%, $P = .0005$).

Logistic Regression Results

Formal training in continuity clinic predicted modeling shared reading (OR 1.95, 95% CI 1.45−2.63), and using

Table 3. Perceived Level of Influence of The Training Modalities Among Participants Reporting Each Type of Training Experience %(95%CI)*

	Not at All Influential	Minimally Influential/Influential	Very/Extremely Influential
Learned in clinic from other residents or faculty (n = 1302)	0.9% (0.4−1.6)	31.8% (29.3−34.4)	67.3% (64.7−69.8)
Formal training in continuity clinic (n = 933)	2.7% (1.7−3.8)	40.5% (37.5−43.8)	56.8% (53.6−60.0)
Formal in-person training (n = 751)	5.3% (3.8−7.2)	39.5% (36.0−43.2)	55.1% (51.5−58.7)
Conference (n = 663)	9.1% (6.9−11.2)	46.3% (42.5−50.1)	44.6% (40.9−48.4)
Online ROR training (n = 726)	8.4% (6.4−10.4)	52.8% (49.0−56.4)	38.8% (35.8−42.6)
Grand rounds (n = 527)	12.3% (9.5−15.1)	52.2% (47.8−56.5)	35.5% (31.4−39.6)

ROR indicates Reach Out and Read.

*Differences in percentages were deemed significant in the absence of overlapping confidence intervals.

Table 4. Demographic and Training Predictors of LP Behaviors [OR(95%CI)]*

Predictors	OR	(95% CI)	
Distributed Books			
Resident/Faculty status†	0.96	0.46	2.00
Online ROR training	1.70	0.71	4.06
Formal training in continuity clinic	1.64	0.65	4.13
Formal in-person training	1.22	0.48	3.08
Learned in clinic from others	**4.54**	**2.09**	**9.84**
Grand rounds	0.77	0.27	2.20
Conference	1.31	0.52	3.35
Giving a Book at Beginning of Visit‡			
Resident/Faculty status†	**1.45**	**1.14**	**1.83**
Online ROR training	**1.65**	**1.28**	**2.14**
Formal training in continuity clinic	0.88	0.66	1.17
Formal in-person training	1.18	0.90	1.56
Learned in clinic from others	0.94	0.63	1.40
Grand rounds	0.70	0.52	0.94
Conference	1.19	0.90	1.57
Provided Relevant Anticipatory Guidance			
Resident/Faculty status†	**2.13**	**1.53**	**2.97**
Online ROR training	**1.56**	**1.12**	**2.18**
Formal training in continuity clinic	1.39	0.96	2.02
Formal in-person training	0.98	0.69	1.41
Learned in clinic from others	**2.41**	**1.58**	**3.69**
Grand rounds	0.65	0.44	0.95
Conference	1.14	0.80	1.64
Modeled Shared Reading			
Resident/Faculty status†	**3.01**	**2.34**	**3.87**
Online ROR training	1.19	0.92	1.54
Formal training in continuity clinic	**1.95**	**1.45**	**2.63**
Formal in-person training	1.05	0.79	1.39
Learned in clinic from others	1.45	0.97	2.18
Grand rounds	0.90	0.67	1.23
Conference	1.14	0.86	1.51
Used Books at Tools for Developmental Assessment			
Resident/Faculty status†	**2.53**	**1.93**	**3.32**
Online ROR training	1.19	0.91	1.56
Formal training in continuity clinic	**1.47**	**1.08**	**2.01**
Formal in-person training	0.92	0.68	1.24
Learned in clinic from others	**1.65**	**1.11**	**2.45**
Grand rounds	0.93	0.67	1.28
Conference	1.22	0.91	1.65

ROR indicates Reach Out and Read.

Significant predictors are indicated in bold.

*Odds of performing each LP behavior among those with each training compared to those without that training, while controlling for other trainings received and resident/faculty status.

†The odds of performing a given LP behavior given that you are a faculty compared to those who are residents while controlling for all trainings received.

‡Estimated among those who reported distributing books.

books as tools for developmental assessment (OR 1.47, 95% CI 1.08−2.01) (Table 4). Learning in clinic from other residents or faculty predicted both book distribution (OR 4.54, 95% CI 2.09−9.84) and using books as tools for developmental assessment (OR 1.65, 95% CI 1.11−2.45), in addition to providing relevant anticipatory guidance (OR 2.41, 95% CI 1.58−3.69) (Table 4). The online ROR training predicted giving a book at the beginning of the visit (OR 1.65, 95% CI 1.28−2.14) among those who reported book distribution, and providing relevant anticipatory guidance (OR 1.56, 95% CI 1.12 −2.18) (Table 4).

Faculty status (independent of training) predicted providing a book at the beginning of the visit, providing relevant anticipatory guidance, modeling shared reading, and using the books as tools for developmental assessment, however, it did not predict book distribution (Table 4).

DISCUSSION

This is the first national survey of pediatric continuity clinic faculty and residents describing LP training and behaviors in residency programs and the association between training modalities and LP behaviors. The survey responses demonstrate variability in ROR training and variability in fidelity to the ROR model for both faculty and residents. While faculty were more likely than residents to report having completed the online ROR training, many had not, and residents were more likely than faculty to learn LP from other doctors in clinic. There was no difference between the proportion of faculty and residents who reported exposure to any of the other training modalities. Most respondents reported learning LP skills in clinic from other residents or faculty and found this to be the most influential modality. However, respondents also listed training during medical school and through other modalities such as through use of training DVDs and maintenance of certification projects, among others. Most faculty and residents reported distributing books in their clinic as a part of ROR; yet fewer reported providing literacy based anticipatory guidance, modeling shared reading, and using a book as a tool for developmental assessment. In addition, while it was reported that many programs have books in their waiting rooms, the provision of volunteer readers, information about local libraries, and adult literacy information is far from universal. Those who reported participating in formal training modalities, compared to those who did not, were more likely to participate in a variety of LP behaviors.

TRAINING AND RESEARCH IMPLICATIONS

Other research has found that pediatricians do not feel adequately trained in promoting early child development.[19] Despite the need for further pediatrician training, a gap has been reported between the goal of LP to families and the training that residents reportedly receive.[20] In a study of 1 residency program site, it was found that only 21% of 71 pediatric residents recalled receiving formal ROR training.[20] Other studies have found that ROR training is encouraged to increase LP among residents, however, many barriers exist to effective training,[21] and in addition, only half of pediatricians feel adequately trained in LP.[22] This highlights the need for high quality early literacy training in residency programs and evaluation of this training. In particular, the online training through ROR can be utilized to a greater extent. However, while participation in the online training was a significant predictor of providing the book at the beginning of the visit

and providing relevant anticipatory guidance, formal training in continuity clinic and learning in clinic from other residents or faculty were significant predictors of other LP behaviors such as modeling shared reading and using books as tools for developmental assessment. This may imply that concepts such as performing developmental assessment and modeling shared reading are best taught in an in-person setting. Thus, consideration should be made in application of the online training and use in conjunction with on-site training modalities, especially given that respondents found learning from others in clinic to be most influential. Also of note, it was mentioned by several respondents that they received training during medical school. There is currently no literature on LP training during medical school and this should be an area of further study.

Of additional concern, very few respondents reported participating in fundraising activities. Given that learning the skills during residency to obtain funding for a ROR program is an important component of sustaining a ROR site, it would be desirable for residents to receive training not only in how to implement ROR with patients and their families, but how to manage its financial implications for a practice.

Other research implications include the need for prospective trials of different LP training modalities, exploration of LP training in the context of development and behavioral pediatrics training, and exploration of the role of informal training in LP. In addition, subsequent studies similar in nature to this study, among other physician groups (family medicine continuity clinics, community pediatric, and family medicine clinics) should be performed. In addition, this study did not ask about multilingual or multicultural aspects of LP; future studies could explore these elements further.

LIMITATIONS

There were several limitations to this study. First, this was a cross-sectional survey and thus cannot speak to a causal relationship between training and implementation of the intervention, but rather an association. Further prospective studies will be needed to answer this question, and to explore how variability in training affects patient outcomes. Second, this online survey used a common link and did not send individual survey links to participants. Therefore, respondents could potentially complete the survey more than once. Third, this was a study of pediatric continuity clinic faculty and residents, therefore the findings may not generalize to those outside pediatric residency training programs. Fourth, there is the potential for bias, including social desirability bias and selection bias, which may have impacted the results in a positive direction. In addition, response bias may have contributed to the fact that while the ROR National Center data has shown that 92% of residency programs implement ROR, 99% of this study's respondents reported that their clinic implements ROR (Reach Out and Read National Center Data, unpublished, 2019). Fifth, terms used to describe various forms of training could be interpreted in various ways, for example, "formal training in continuity clinic" and "formal in-person training" could be interpreted as 2 different training modalities or as overlapping trainings. In addition, while the survey assessed reported frequency of LP behaviors, these estimates were not used in modeling of training predictors and LP behaviors due to difficulty in interpretation and poor clinical utility as there is no established scale for frequency of performance of each given LP behavior in terms of patient outcomes, among others. Finally, site demographic data were obtained from individual respondents and not at a site level. Additionally, demographic data could have been more in depth and included more questions on faculty participants including years in practice. Despite the limitations of this study, this large national survey with a high response rate from faculty (90%) provides the opportunity to make national inferences about pediatric continuity clinics and their providers, and this is the first study to address LP behaviors and training on a national level.

CONCLUSIONS

There appears to be room for improvement in faculty and resident implementation of ROR with fidelity to the original evidence-based model. Residents could adhere more closely to the model when implementing ROR. Training should be implemented to a greater extent in pediatric residency programs to improve training of residents in implementation of all facets of the ROR model, and training should be dynamic in both content and delivery.

Improvements in formal training modalities, especially use of the online ROR training in conjunction with on-site training, could improve delivery of ROR with fidelity to the model.

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SUPPLEMENTARY DATA

Supplementary data related to this article can be found online at https://doi.org/10.1016/j.acap.2020.04.008.

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