Health and growth status of immigrant and refugee children in Toronto, Ontario: A retrospective chart review

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OBJECTIVE: To describe selected anthropometric and health status variables among immigrant and refugee children ≤6 years of age within an inner city clinic in Toronto, Ontario.

METHODS: A retrospective chart review of patients born between January 1, 1998 and December 31, 2008, was conducted at a Toronto community health centre serving a primarily immigrant and refugee population. Outcome measures included calculated age-specific percentiles for height and weight, and the prevalence of anemia, iron deficiency, enteric parasites, elevated lead levels, HIV and hepatitis B. Postal codes were collected and used to determine the patient's neighbourhood income quintile.

RESULTS: A total of 331 patients, born between January 1, 1998 and December 31, 2008, were identified. Of these, a total of 210 charts were manually reviewed. The prevalence of height-for-age and weight-for-age under the third percentile on the Centers for Disease Control and Prevention Growth Charts were 7.2% and 11.6%, respectively, and 8.4% and 5.0%, respectively, on the WHO Growth Standards Chart. Prevalence rates were also calculated for anemia (22.8%), iron deficiency (53.3%), hepatitis B (2.5%), parasitic infections (33.6%), elevated blood lead levels (4.9%) and HIV (0%). Neighbourhood income quintiles revealed that 46.7% of patients were residing in the lowest (ie, poorest) income quintile neighbourhoods.

CONCLUSION: These findings reveal a high burden of illness within the population presenting to an immigrant/refugee health clinic, and illustrate the need for further research in this area, as well as increased efforts to ensure appropriate screening within clinics serving a high volume of newcomer patients.

Key Words: *Canada; Child; Emigrants; Health; Immigrants; Refugees*

La santé et la croissance des enfants immigrants et réfugiés de Toronto, en Ontario : un examen rétrospectif des dossiers

OBJECTIF : Décrire certaines variables anthropométriques et liées à la santé d'enfants immigrants et réfugiés de moins de six ans dans une clinique des quartiers pauvres de Toronto, en Ontario.

MÉTHODOLOGIE : Les chercheurs ont procédé à une analyse rétrospective des dossiers de patients nés entre le 1er janvier 1998 et le 31 décembre 2008 dans un centre de santé communautaire de Toronto qui dessert une population surtout composée d'immigrants et de réfugiés. Les mesures de résultats incluaient le calcul des percentiles propres à l'âge pour la taille et le poids ainsi que la prévalence d'anémie, de carence en fer, de parasites entériques, de taux élevés de plomb, de VIH et d'hépatite B. Ils ont recueilli et utilisé les codes postaux pour déterminer le quintile de revenu du quartier de résidence des patients.

RÉSULTATS : Au total, les chercheurs ont repéré 331 patients, nés entre le 1er janvier 1998 et le 31 décembre 2008, et révisé manuellement 210 dossiers. La prévalence de taille et de poids par rapport à l'âge se situant sous le troisième percentile selon les courbes de croissance des *Centers for Disease Control and Prevention* s'élevait à 7,2 % et 11,6 %, respectivement, et à 8,4 % et 5,0 %, respectivement, selon les courbes de croissance standard de l'OMS. Les chercheurs ont également calculé la prévalence d'anémie (22,8 %), de carence en fer (53,3 %), d'hépatite B (2,5 %), d'infections parasitaires (33,6 %), de taux élevés de plomb dans le sang (4,9 %) et de VIH (0 %). Les quintiles de revenu des quartiers de résidence ont révélé que 46,7 % des patients habitaient dans les quartiers aux quintiles de revenu les plus faibles (c'est-à-dire les plus pauvres).

CONCLUSION : Ces observations révèlent un fardeau élevé de maladie au sein des populations qui consultent dans une clinique de santé pour les immigrants et les réfugiés et démontrent la nécessité de poursuivre les recherches dans ce domaine ainsi que d'accroître les efforts pour garantir un dépistage convenable dans les cliniques qui desservent un fort volume de nouveaux arrivants.

The immigrant and refugee population in Canada is growing every year, and currently represents 20.6% of the total Canadian population (1). Toronto, Ontario, is a common port of entry for newly-arrived immigrants and refugees. Recent data reveal that in 2011, immigrants comprised nearly 46% of the population in the Toronto census metropolitan area (2).

Given the large influx of immigrants and refugees, it has become increasingly important to identify and address the specific health issues of this population in general, and the paediatric newcomer population in particular. International studies investigating the health status of immigrant and refugee children have found an epidemiologically distinct disease profile among this population (3-10). Specifically, there is a higher prevalence of nutritional anemia, inadequate immunity to vaccine-preventable diseases, growth abnormalities, malnutrition, dental caries, enteric parasites and psychiatric disorders among the children of recent arrivals. Additionally, lower family socioeconomic status among recent immigrants has a significant impact on their children's health and development (5,11-14).

In response to the increasing number of newcomers to Canada and uncertainty among clinicians regarding best practice primary care for these patients, in 2011, the Canadian Collaboration for

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Immigrant and Refugee Health released a comprehensive set of evidence-based guidelines on primary and preventive health care for immigrant and refugee populations. These guidelines include recommendations for catch-up immunization and screening for anemia, as well as targeted serological testing for hepatitis B and intestinal parasites (specifically *Strongyloides* and *Schistosoma*) among individuals coming from countries with a high prevalence (10). Both the American Academy of Pediatrics and the Canadian Paediatric Society have developed guidelines and tools, which address the unique disease profiles within foreign-born children, and recommend targeted screening for health and developmental issues (15-17).

Within Canada, very few studies have examined the prevalence of general health issues and infectious diseases, specifically among school- and preschool-age immigrant and refugee children. Two studies involving immigrant children in Canada revealed a greater risk for vitamin D deficiency (7,18). A mixed-methods qualitative study involving refugee mothers described multiple barriers (including cost) to seeking health care and health services for their children (19). A study involving routine HIV screening for paediatric patients applying for residency in Canada revealed that between January 2002 and February 2005, 36 paediatric HIV cases were reported (14 of 100,000 applicants) (20).

The goal of the present study was to add to the current literature on the immigrant and refugee paediatric populations in Canada, by describing select anthropometric and health status variables among foreign-born children ≤6 years of age, within a clinic serving a high volume of newcomer patients. This age group was chosen for several reasons. First, as discussed previously, few Canadian studies have focused on the health issues of immigrant and refugee children. Second, health and growth in the first few years has a significant impact on cognitive development and health outcomes later in life, and adequate screening and monitoring is, therefore, of utmost importance during this period. Finally, routine health maintenance visits are scheduled most frequently during this age interval, enabling improved identification of health and developmental issues.

METHODS

A retrospective chart review was performed at Access Alliance Multicultural Health and Community Services (AAMHCS; Toronto, Ontario). AAMHCS provides health and social services to newly arrived immigrants and refugees residing in Toronto, Ontario. During the five years preceding the data collection, AAMHCSs patient population shifted to include more government-assisted refugees (GARs), refugee claimants, as well as uninsured patients. A series of screening tests were offered to all of the clinic's newly-registered paediatric patients. Patients born between January 1, 1998 and December 31, 2008, were identified using the electronic patient database. Charts were manually reviewed for other inclusion criteria: not born in Canada; and ≤6 years of age on arrival to Canada. For patients who were >6 years of age at the time of chart review, data were only collected up to and including six years of age. Manual chart review was performed by one of the primary investigators (LS) and a research assistant using a standard data extraction sheet. All outlier values and positive screening tests were verified by both investigators to ensure validity and reliability of the results.

Demographic characteristics were collected for each chart, specifically, age, sex, date of birth, date of arrival in Canada and country of origin. Data were also collected and recorded on anthropometric measurements, specifically, first recorded height and weight obtained by the clinical staff (nurses, nurse practitioners and physicians) during the child's initial clinic visit. Percentiles for height and weight were determined using the age- and sex-appropriate Centers for Disease Control and Prevention (CDC; Georgia, USA) Clinical Growth Charts. Prevalences were calculated for children who fell below the third percentile threshold for age-specific height and weight. The third percentile mark was selected due to its significance in the clinical setting as a trigger for investigation of potential growth abnormalities. Following completion of the study, subgroup analysis (using the WHO Anthro for PC software [WHO, Switzerland]) was performed to determine the prevalence of age-specific height and weight abnormalities, determined by the WHO Child Growth Standards (using a cut-off *z*-score of ≤−2, which indicates a percentile measurement of approximately ≤2.3). Data were also collected regarding the presence of: iron deficiency (defined as ferritin levels below the age-specific laboratory lower reference limits); anemia (defined as hemoglobin levels below the age-specific laboratory lower reference limits); parasitic enteric infections (positive stool culture for ova and parasites); hepatitis B (positive hepatitis B surface antigen levels); HIV (positive ELISA test); and elevated lead levels (lead levels ≥ 0.48 µmol/L).

Postal codes were also collected and used to determine the patient's neighbourhood income quintile. Income quintiles divided the population into five groups based on the calculated average household income within each neighbourhood. Neighbourhoods were categorized from least affluent (Q1) to most affluent (Q5). Using Statistics Canada's Postal Code Conversion File Plus, individual postal codes were converted into neighbourhood income quintiles as a proxy for household income quintile.

Summary statistical analyses were conducted using Excel (Microsoft Corporation, USA).

Ethics approval was obtained from St Michael's Hospital's Research Ethics Board (Toronto, Ontario).

RESULTS

A total of 331 patients, born between January 1, 1998 and December 31, 2008, were identified. Of these, 41 charts were unable to be located. Eighty charts were excluded because the patients were either born in Canada or were >6 years of age on arrival to Canada. A total of 210 charts were manually reviewed.

The study population consisted of 91 (43.3%) females and 119 (56.7%) males. Ages on arrival ranged from two months to six years 10 months. Some countries of origin were over-represented within the clinic sample, specifically Afghanistan (n=30), Myanmar (n=21) and Colombia (n=19). With respect to the distribution of neighbourhood income quintiles among the study population, nearly one-half of the population (46.7%) was residing in the lowest income quintile neighbourhoods. Full demographic data are summarized in Table 1.

Of the 167 subjects with documented height measurements, 7.2% (n=12) fell below the third percentile within the CDC Growth Charts. Of the 180 subjects with documented weight measurements, 11.6% (n=21) fell below the third percentile. Children from Afghanistan and Myanmar were heavily over-represented among those who fell below the third percentile for both height and weight. Using the WHO Growth Standards, the prevalence of height abnormalities was 8.4% (n=14) and prevalence of weight abnormalities was 5.0% (n=9).

Table 2 summarizes the results of the screening tests among the study population. Given the small and variable sample sizes of children from each country, only observations on the regional prevalence of each outcome were made. Among the 49 children testing positive for iron deficiency, 10 were from Myanmar and 11 were from Afghanistan. Of the 122 patients who submitted stool

TABLE 1
Baseline characteristics of clinic sample

Characteristic	
Total, n	210
Sex	
Male	119 (56.7)
Female	91 (43.3)
Age at arrival, years	
Median, n	2.67
Mean, n	2.87
N/A*, n	10
Time since arrival, months	
Median, n	1
Mean, n	4.8
Region of origin	
Middle East, Central Asia†	57 (27.1)
Latin America and the Caribbean‡	48 (22.9)
Sub-Saharan Africa	43 (20.5)
South East Asia§	26 (12.4)
Eastern Europe	18 (8.6)
Western Europe	10 (4.8)
Indian sub-Continent	6 (2.9)
United States	2 (1.0)
Income quintile	
1st (lowest)	98 (46.7)
2nd	43 (20.5)
3rd	43 (20.5)
4th	13 (6.2)
5th (highest)	3 (1.4)
Missing data	10 (4.8)
Total, n	210

*Data presented as n (%) unless otherwise indicated. *N/A indicates data not available, ie, this information was not collected or did not appear in the clinic chart; †30 of 57 children in this category were from Afghanistan; ‡19 of 48 children in this category were from Colombia; §21 children within this category were from Myanmar*

TABLE 2
Results of routine screening tests among clinic sample

Test	
Anemia	
Present*	33 (22.8)
Absent	112 (77.2)
N/A, n	65
Low ferritin	
Present†	49 (53.3)
Absent	43 (46.7)
N/A, n	118
Parasitic infections	
Present‡	41 (33.6)
Absent	81 (66.4)
N/A, n	88
Hepatitis B surface antigen	
Positive	3 (2.5)
Negative	119 (97.5)
N/A, n	88
Lead levels	
Above limits	4 (4.9)
Below limits	77 (95.1)
N/A, n	129
HIV	
Positive	0 (0.0)
Negative	101 (100.0)
N/A, n	109

*Data presented as n (%) unless otherwise indicated. *Value falls below the lower reference limit for hemoglobin concentration; †Value falls below the lower reference limit for ferritin concentration; ‡Intestinal parasite found on stool ova and parasite sample. For optimal sensitivity, three sets of stool samples are recommended. N/A Not available*

samples for testing of ova and parasites, 41 children provided 53 positive samples (10 subjects had >1 positive stool sample). Of these, 7.5% (n=4) were *Dientamoeba hystolytica*, 37.7% (n=20) *Giardia lamblia*, 28.3% (n=15) *Dientamoeba fragilis*, 15.1% (n=8) *Ascaris lumbricoides*, 3.8% (n=2) *Enterobius vermicularis*, 4.0% (n=2) *Hymenolepis nana*, 1.9% (n=1) *Cyclospora cayetane* and 1.9% (n=1) *Strongyloides stercoralis*. Positive stool samples were found primarily among children from Afghanistan, Myanmar and Sub-Saharan Africa.

DISCUSSION

Our study revealed a high proportion of height and weight measurements falling under the third percentile within the present clinic population. A study by Geltman et al (4) revealed a similar prevalence of anthropometric abnormalities (using the CDC Growth Chart) in a study involving 1825 refugee children in Massachusetts, USA. However, the prevalence of abnormal weight measurements within our clinic sample was lower, while that of abnormal height measurements was higher when using the WHO Growth Standards. These findings are consistent with previous observations, demonstrating that for the same population, when compared with the CDC Growth Charts, the WHO Growth Standards reveal lower rates of underweight and wasting, and higher rates of stunting (21). While our sample size was too small to allow for conclusive determinations, our results suggest that abnormal or unhealthy growth may be an issue of concern for certain subgroups of newcomer children, although prevalence rates – particularly of underweight or wasting – may be overestimated if using the CDC Growth Charts.

We found a high prevalence of iron deficiency and anemia within the clinic sample. The prevalence of anemia within Canada has been estimated to be 4% to 5% among non-Aboriginal children, but present in up to 46% to 66% of children <4 years of age in low- and middle-income countries (22,23). Iron deficiency and anemia in childhood may have significant and long-lasting effects on neurodevelopment and behaviour. Therefore, the Canadian Paediatric Society, the American Academy of Pediatrics and The Canadian Collaboration for Immigration and Refugee Health all recommend screening for anemia in infancy and early childhood, particularly for 'high-risk' children.(10,16,24)

We also found a high prevalence of elevated blood lead levels (BLL) in the clinic population. Studies from the United States (US) involving newly-arrived refugee children, similarly demonstrate higher rates of elevated BLL within this population (9,25). There is no representative nationwide picture of current BLL in Canadian children, although US national screening data reveal a prevalence of elevated BLL (≥10 µg/dL) of 0.8% among children one to five years of age (26). Children <6 years of age are at greater risk for exposure to lead due to crawling and hand-to-mouth behaviour, and more susceptible to the toxic effects of lead due to an incomplete blood-brain barrier and active neurodevelopment in the first years of life. The US CDC has a number of explicit guidelines with respect to lead screening in newly-arrived refugee children (25). Within Canada, although universal BLL screening

in children has never been supported, targeted screening of high-risk paediatric populations has been endorsed (27).

A high prevalence of intestinal parasites and hepatitis B was found in the present study population. The higher rate of hepatitis B is likely due to increased prevalence, and lack of access to childhood immunization and prenatal screening in the childrens' home countries. Intestinal parasites were found particularly in children from Myanmar, Sub-Saharan Africa and Afghanistan. Since 1997, the CDC has released and updated recommendations on overseas presumptive treatment of various intestinal parasites for US-bound refugees from parts of Latin America, the Caribbean Islands, Asia, the Middle East and Africa (28). No such guidelines exist for refugees accepted for migration to Canada.

Several limitations exist in the present study. First are the limitations inherent to chart reviews, including: incomplete charting, failure to locate all charts, and potential human error in measuring and recording clinical data at the time of the clinical assessment, as well as in the data entry process. Second, routine screening tests were not performed for all patients. Although the clinic offers testing to all new patients, the lack of uptake by some likely introduced a certain degree of bias into our results. Third, we did not have access to reliable data regarding the immigration status (ie, refugee claimant versus GAR versus landed immigrant) of the patients at the time of their initial clinic visit and were, therefore, not able to perform analysis of outcomes as a function of newcomer category. Fourth, we only recorded one measurement for height and weight, as opposed to several measurements over time. Therefore, the growth abnormalities do not fit the definition of 'failure to thrive'. Fifth, several outcomes collected were based on screening tests (as opposed to diagnostic tests). Of note, stool ova and parasite testing has low sensitivity for several enteric parasites, particularly if only one or two samples are submitted, as was the case in our study. Therefore, our outcome measures likely underestimated the true prevalence of enteric parasites within the present clinic sample, particularly among children from countries of origin with a high prevalence. Finally, the present study compromises data from a small convenient sample of children within one clinical setting serving a high volume of newcomer immigrants and refugees and, therefore, may not be representative of the general population of foreign-born children within Toronto or within Canada.

Immigrants and refugees are a very heterogeneous group with different countries of origin, educational levels and socioeconomic status. There is a paucity of systematic data regarding the distinct health issues and risk profiles for various categories of foreign-born children. Economic and family class immigrants differ greatly in terms of various socioeconomic status variables from refugees (2,29). Various authors have identified a 'healthy immigrant' effect – largely among economic and family class immigrants – which is likely a reflection of the health requirements of the immigrant selection program and premigration medical examination. Conversely, refugee-class immigrants have been demonstrated to have a poorer health status (10,29,30).

During the timeline covered by the present study, there was a shift in AAMCHS's patient population to include a far greater number of GARs and refugee claimants, particularly those belonging to waves of refugees coming to Canada from certain countries during that time. Some of the above discussed variability in health status as a function of newcomer category was observed within the study results, in the form of a disproportionately high burden of illness among children from certain countries and regions of origin. Therefore, the findings from the present study cannot be applied to all foreign-born children, because they likely underestimate the burden of disease for some and overestimate for others. Variations in health status within different categories of newcomers and foreign-born children is an area in need of further research.

CONCLUSION

The findings of the present study reveal a high burden of disease and low socioeconomic status among immigrant and refugee children, particularly those from Afghanistan, Sub-Saharan Africa and certain parts of Southeast Asia. These findings highlight the need for more research examining health issues specific to this particularly vulnerable patient population, as well as increased efforts to ensure access to appropriate targeted screening and health care services to foreign-born children, particularly those observed within clinics serving a high volume of immigrant and refugee patients.

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REFERENCES

1. Statistics Canada: National Household Survey: Immigration and Ethnocultural Diversity in Canada. 2013. <www12.statcan.gc.ca/nhs-enm/2011/as-sa/99-010-x/99-010-x2011001-eng.cfm#a1> (Accessed December 12, 2014).
2. Ontario Ministry of Finance: Office of Economic Policy: 2011 National Household Survey Highlights: Factsheet 1 – Immigration. 2013.
3. Schwarzwald H. Illnesses among recently immigrated children. Semin Pediatr Infect Dis 2005;16:78-83.
4. Geltman PL, Radin M, Zi Z, Cochran J, Meyers AF. Growth status and related medical conditions among refugee children in Massachusetts, 1995-1998. Am J Public Health 2001;91:1800-5.
5. Leventhal T, Brooks-Gunn J, Xue Y. Immigrant differences in school-age children's verbal trajectories: A look at four racial/ethnic groups. Child Dev 2006;77:1359-74.
6. Raman S, Wood N, Webber M, Taylor K-A, Isaacs D. Matching health needs of refugee children with services: How big is the gap? Aust N Z J Public Health 2009;33:466-70.
7. Aucoin M, Weaver R, Thomas R, Jones L. Vitamin D status of refugees arriving in Canada: findings from the Calgary Refugee Health Program. Can Fam Physician 2013;59:e188-94.
8. Mutch RC, Cherian S, Nemba K, et al. Tertiary paediatric refugee health clinic in Western Australia: Analysis of the first 1026 children. J Paediatr Child Health 2012;48:582-7.
9. Proue M, Jones-Webb R, Oberg C. Blood lead screening among newly arrived refugees in Minnesota. Minn Med 2010;93:42-6.
10. Pottie K, Greenaway C, Feightner J, et al. Evidence-based clinical guidelines for immigrants and refugees. CMAJ 2011;183:E824-925.
11. To T, Guttmann A, Dick PT, et al. What factors are associated with poor developmental attainment in young Canadian children? Can J Public Health 2004;95:258-63.
12. Seguin L, Xu Q, Potvin L, Maria-Victoria Z, Frohlich KL. Effects of low income on infant health. CMAJ 2003;168:1533-38.
13. Quintana SM, Chao RK, Cross WE, Jr, et al. Race, ethnicity, and culture in child development: Contemporary research and future directions. Child Dev 2006;77:1129-41.

14. Normand CL, Baillargeon RH, Brousseau J. Family socioeconomic status and cognitive development in the first year of life. CanJ Behav Sci 2007;39:202-19.
15. American Academy of Pediatrics: Providing care for immigrant, migrant, and border children. Pediatrics 2013;131:e2028-34.
16. Canadian Paediatric Society. Caring for Kids New to Canada. <www.kidsnewtocanada.ca> (Accessed May 8, 2015).
17. Committee on Infectious Diseases; American Academy of Pediatrics: Red Book: 2012 Report of the Committee on Infectious Diseases, 29th edn. USA: American Academy of Pediatrics; 2012.
18. Omand JA, Non-western immigrant children have lower 25-hydroxyvitamin D than children from western families. Public Health Nutr 2014;17:1547-54.
19. Wahoush EO. Equitable health-care access: The experiences of refugee and refugee claimant mothers with an ill preschooler. CJNR 2009;41:21.
20. MacPherson DW, Zencovich M, Gushulak BD. Emerging pediatric HIV epidemic related to migration. Emerg Infect Dis 2006;12:612-7.
21. Dietitians of Canada; Canadian Pediatric Society; College of Family Physicians of Canada; Community Health Nurses of Canada. Promoting Optimal Monitoring of Child Growth in Canada: Using the New WHO Growth Charts. <www.cps.ca/tools/growth-charts-statement-FULL.pdf> (Accessed April 25, 2015).
22. Zlotkin S. Clinical nutrition: 8. The role of nutrition in the prevention of iron deficiency anemia in infants, children and adolescents. CMAJ 168:59-63.
23. Zlotkin SH, Ste-Marie M, Kopelman H, Jones A, Adam J. The prevalence of iron depletion and iron-deficiency anaemia in a randomly selected group of infants from four Canadian cities. Nutr Res 1996;16:729-33.
24. Baker RD. Diagnosis and prevention of iron deficiency and iron-deficiency anemia in infants and young children (0-3 years of age). Pediatrics (Evanston) 2010;126:1040-50.
25. Centers for Disease Control and Prevention (CDC): Refugee Health Guidelines: Screening for lead during the domestic medical examination for newly-arrived refugees. 2013. <www.cdc.gov/immigrantrefugeehealth/guidelines/lead-guidelines.html#References> (Accessed November 8, 2014).
26. Centers for Disease Control and Prevention (CDC): Blood Lead Levels in Children Aged 1-5 Years – United States, 1999 – 2010. MMWR Morb Mortal Wkly Rep 2013;62:4.
27. Sanborn MD, Alan, Abelsohn, Campbell M, Weir E. Identifying and managing adverse environmental health effects: 3. Lead exposure. CMAJ 2002;166:1287-92.
28. Centers for Disease Control and Prevention (CDC): Guidelines for Overseas Presumptive Treatment of Strongyloidiasis, Schistosomiasis, and Soil-Transmitted Helminth Infections. 2013. <www.cdc.gov/immigrantrefugeehealth/guidelines/overseas/intestinal-parasites-overseas.html#references> (Accessed September 27, 2014).
29. Zhao J, Xue L, Gilkinson T. Health Status and Social Capital of Recent Immigrants in Canada: Evidence from the Longitudinal Survey of Immigrants to Canada. Citizenship and Immigration Canada. 2010.
30. Beiser M: The health of immigrants and refugees in Canada. Can J Public Health 2005;96:S30-44.