Published in final edited form as:
Pediatr Allergy Immunol. 2014 November ; 25(7): 644–650. doi:10.1111/pai.12284.

International survey of knowledge of food-induced anaphylaxis

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Abstract

Background—Studies show that anaphylaxis is under-recognized and epinephrine (adrenaline) is under-used by medical personnel as well as patients and their families. This study assesses the knowledge of food-induced anaphylaxis diagnosis and management across different populations of providers and caregivers and other interested respondents.

Methods—An online survey embedded in a case discussion food-induced anaphylaxis was distributed by Medscape to registered members.

Results—7822 responders who started the activity chose to answer at least some of the questions presented (response rate 39.5%). Over 80% of responders in all groups correctly identified the case of anaphylaxis with prominent skin and respiratory symptoms, however, only 55% correctly recognized the case without skin symptoms as anaphylaxis. Only 23% of responders correctly selected risk factors for anaphylaxis, with physicians significantly more likely to choose the correct answers as compared to allied health, other health professionals and medical students ($p<0.001$). Ninety five perecnt selected epinephrine (adrenaline) as the most appropriate treatment for anaphylaxis, and 81% correctly indicated that there are no absolute contraindications for epinephrine (adrenaline) in the setting of anaphylaxis. When presented a case of a child with no documented history of allergies who has symptoms of anaphylaxis, more physicians than any other group chose to administer stock epinephrine (adrenaline) (73% vs 60%, $p<0.001$).

Conclusion—Specific knowledge deficits for food-induced anaphylaxis persist across all groups. Further educational efforts should be aimed not only at the medical community but also for the entire caregiver community and general public, to optimize care for food allergic individuals.

Keywords

allergy; anaphylaxis; epinephrine (adrenaline); food

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Introduction

Food allergy is an important public health concern as prevalence has been increasing in recent years.[1] Data indicate that 5.1% of children 0–17 years of age were affected by food allergies in 2009–2011, an increase from 3.4% in 1997–1999.[2] Anaphylaxis is a potentially life-threatening allergic reaction that is unpredictable in onset and requires timely recognition and treatment for improved outcomes.[3] Allergic reactions to foods are the leading cause of anaphylaxis in patients of all ages outside of the hospital setting,[4,5] and recent data showing increases in emergency department visits and admissions for food-induced anaphylaxis indicate that food-induced anaphylaxis remains an important issue to address.[6,7]

Severe reactions, including fatalities, can occur as a result of anaphylaxis, and approximately 200 fatalities are reported in the U.S. per year.[8] Up to 30% of fatal anaphylaxis cases are triggered by food allergens. While the prevalence of nut allergies have been documented to increase in recent years,[9] and nuts have been implicated in the majority of fatal anaphylaxis cases,[10] it is important to note that fatal anaphylaxis has been reported with other foods and can potentially occur with any food allergy. Because the severity of allergic reactions to foods cannot be predicted by either the severity of prior reactions or by allergy test results (skin prick testing or allergen-specific IgE level),[11] timely recognition of the signs and symptoms of anaphylaxis and prompt initiation of treatment are necessary for optimal outcomes.

Diagnosis is based on the recognition of a symptom constellation and can be challenging because classic allergic skin symptoms are not always present and many symptoms of anaphylaxis mimic those observed in related allergic and non-allergic disorders.[3,12–13] An Expert Panel supported by the NIAID developed a consensus definition in order to facilitate identification of symptoms and prompt initiation of treatment.[3]

Despite this, studies continue to show that anaphylaxis is under-recognized and epinephrine (adrenaline) is under-used by medical personnel as well as patients and their families. Several studies have assessed knowledge of physicians in the recognition and treatment of anaphylaxis. Using a case-based surveys, 2 studies showed that only 56% and 72% of responders were able to recognize food-induced anaphylaxis and select appropriate treatment with epinephrine.[14,15] Similarly, results from an online survey distributed to physicians in 22 Latin American countries showed that only 71% would prescribe intramuscular epinephrine for the treatment of anaphylaxis.[16] Fewer studies have been performed in allied health professionals and lay populations.[17–21] These studies have noted that deficiencies in knowledge of anaphylaxis and its management exist across all groups.

The aim of this study was to assess the current knowledge of food-induced anaphylaxis diagnosis and management across different populations with medical and non-medical backgrounds.

Methods

An online survey embedded in a case discussion of food-induced anaphylaxis was distributed by Medscape to examine the respondents' knowledge of the management of food-induced anaphylaxis in children. The 7-question survey instrument was developed by the research team, consisting of 3 academic allergy-immunology physicians (Table 1). The first question asked responders to determine whether the cases presented were consistent with a diagnosis of anaphylaxis. Knowledge of risk factors for severe reactions was assessed in question 2. The next 4 questions focused on management in a scenario of anaphylaxis occurring in a school setting, and the final question addressed management in the case of a child who is not known to have allergies.

Medscape from WebMD is a medical website that provides medical information and educational tools for registered members; registration is free. Medscape posted the survey and collected responses between July 18, 2013 and December 23, 2013. All data collected were de-identified and provided by Medscape in an Excel spreadsheet, thereby deeming this study exempt from human subjects research by the Icahn School of Medicine Institutional Review Board.

Not all respondents answered all the questions, therefore, the results were calculated based on responses to each specific question. Tabular frequencies were used for categorical data. Comparison of categorical data was performed with Chi-square analysis (degrees of freedom = 1) with a 2-tailed p-value. A p-value less than 0.05 was considered significant. Data were analyzed using GraphPad (GraphPad Software, La Jolla, CA).

Results

This educational piece was accessed by 19,792 Medscape members, and a total of 7822 (39.5%) responders who started the activity chose to answer at least some of the questions presented. Of participants, there were 2882 physicians (36.8%), 4168 allied health professionals (53.3%), 362 from other health professions (psychologist, optometrist, dentist/oral health professional) (4.6%), 334 medical students (4.3%), and 78 other non-health individuals (health business/administration, consumer/other, and media/press) (1%). These designations were provided by Medscape.

The majority of responders were from the U.S. (n=5632, 72%); the remaining respondents represented 142 other countries. More the half the physician responders were from outside the U.S. (56%), whereas the majority (>80%) of allied health, other health professionals and non-health professionals were based in the U.S.

Identification of anaphylaxis signs and symptoms

The survey included 4 cases: 2 for which anaphylaxis should be strongly considered, one for viral-induced urticaria and one for cold-induced urticaria (Table 1A). Over 85% of responders (n=7692) in all groups correctly identified a child with acute onset of respiratory and cutaneous symptoms as having anaphylaxis. Fewer identified a child with known peanut allergy who ingested a cookie that was likely cross-contaminated with peanut and had acute

onset of cardiovascular symptoms (lightheadedness, hypotension) without cutaneous symptoms as having anaphylaxis (56.7%). Significantly more physicians identified this case as anaphylaxis as compared to other groups (60.9% vs 42%, p<0.0001).

Approximately half (49%) of physician responders correctly recognized both cases as anaphylaxis. U.S. physicians were more likely to choose both correct answers than non-U.S. physicians (p<0.001). There was no significant difference across medical specialties (Table 2).

Fewer than 5% of responders mistook the cases of viral urticaria or cold urticaria for anaphylaxis.

Risk factors for food-induced anaphylaxis

When presented with various risk factors for food-induced anaphylaxis (age, peanut and tree nut allergies, asthma and history of severe reaction), only 23% of responders (n=5692) selected all the correct answers (Table 1A). Physicians were significantly more likely to choose the correct combination of answers as compared to allied health, other health professionals and medical students (p<0.001).

Among physicians, more U.S. responders choose all correct answers than non-U.S. responders (p<0.001); there was no difference observed when data was analyzed based on the different medical training backgrounds (Table 2).

Across all groups, the majority of responders were able to identify peanut and tree nut allergy (87%) and a history of severe reaction (92%) as risk factors for food-induced anaphylaxis.

Management of anaphylaxis

Regarding questions on the management of anaphylaxis, the respondents were referred to a case of a peanut allergic child with known peanut ingestion during school recess who immediately felt unwell and had difficulty breathing. Several treatment options were presented. Epinephrine (adrenaline) was correctly selected by 95% of responders (n=4115) as the most appropriate treatment (Table 1B).

Knowledge regarding contraindications for epinephrine (adrenaline) was assessed and answered by 4059 respondents (Table 1B). The majority of responders (81%) correctly indicated that there are no absolute contraindications for epinephrine (adrenaline) use in the treatment of anaphylaxis. Physicians were more likely to select this answer than other responders (p<0.001). Among physicians, U.S. physicians were more likely to indicate that there were no absolute contraindications for epinephrine (adrenaline) use than non-U.S. physicians (p=0.002). Of those who did not select this answer, approximately 2/3 believed epinephrine (adrenaline) use for the treatment of anaphylaxis should be discouraged in a child with arrhythmia; 1/3 felt that a history of congenital heart disease would preclude the use of epinephrine (adrenaline) to treat anaphylaxis.

Participants were asked to consider additional steps to be taken for anaphylaxis management after epinephrine (adrenaline) was administered and emergency medical services called (Table 1B). Among all responders (n=3869), >60% chose to lay the child down after epinephrine (adrenaline) was given. Approximately half chose to administer diphenhydramine. Only 26% selected both answers; no significant differences were noted between groups. Walking the child around to ensure she does not lose consciousness was chosen by 4%, and 2% opted to have the child drink some water to help the throat symptoms.

School management

In terms of precautions that schools can take to prevent unintentional food allergen exposures and allergic reactions, 86% of responders (n=3781) advised implementing individual health care plans for children with food allergies under the guidance of the primary care provider and family in collaboration with the school nurse and school staff (Table 1B). Instituting nut-free policies in schools was suggested by 13%.

The survey ended with a case of a young child with no documented history of allergies who presents to the school nurse with diffuse hives, cough, and wheezing after having lunch in the cafeteria (Table 1C). In this scenario, choices for management included administration of stock epinephrine (adrenaline), administration of diphenhydramine and albuterol, asking the child about allergies, calling the parents to inquire about allergies or contacting the primary care physician for guidance. This question was answered by 3524 individuals. More physicians than any other group correctly chose to administer stock epinephrine (adrenaline) in this situation (73% vs 60%, $p<0.001$). Of note, 15% of allied health respondents would call the child's parents first; this was significantly higher than physicians (15.5% vs 4.5%, $p<0.001$).

Discussion

The findings of this study show that knowledge deficits for anaphylaxis are not as great as previously published, however, specific knowledge deficits in the diagnosis and management of food-induced anaphylaxis persist across all populations of respondents. While the majority of responders correctly identified the case of anaphylaxis with prominent skin and respiratory symptoms, only half recognized the case without skin symptoms as being anaphylaxis. This indicates that a substantial number of people, including physicians, may not be aware that anaphylaxis can occur in the absence of cutaneous symptoms.[3] Several surveys have noted that anaphylaxis can present without any skin findings in approximately 10–20% of cases.[22,23]

Nearly all responders identified epinephrine (adrenaline) as the initial medication of choice, and 81% of respondents understood that there is no absolute contraindication for using epinephrine (adrenaline) in the treatment of anaphylaxis. Consistent with findings from a prior study of paramedics, the most common perceived contraindications to epinephrine (adrenaline) were cardiac co-morbidities.[17] In the case of anaphylaxis, this perception is incorrect; experts agree that epinephrine (adrenaline) is the only first-line treatment as all other medications have a delayed onset of action.[3] Symptoms of anaphylaxis are

effectively treated with timely administration of epinephrine (adrenaline) given its α-1, β-1 and β-2 adrenergic effects of increased vasoconstriction, peripheral vascular resistance, decreased mucosal edema, increased inotropy and chronotropy, bronchodilation as well as decreased mediator release from mast cells and basophils.[3] The major risk of fatal anaphylaxis is either the failure or the delay in administration of epinephrine (adrenaline).[10]

Other medications are considered adjunctive; bronchodilators can be given as further treatment for bronchospasm not responsive to epinephrine (adrenaline) and antihistamines can relieve pruritus and urticaria.[3] Corticosteroids are not effective for treatment of acute anaphylaxis, but may have a role in preventing or ameliorating biphasic or protracted anaphylaxis, that may occur in up to 20% of anaphylactic episodes.[24] Regarding post-epinephrine (adrenaline) management, many were unaware that positioning the child supine with legs elevated is advised to enhance cardiac preload in cases of anaphylactic shock.[25] Abrupt upright positioning of the hypotensive patient is contraindicated to avoid orthostatic hypotension. However, in younger children with significant respiratory distress or patients with ongoing emesis, the recumbent position may increase their distress and in these situations, the position of comfort would be preferable.

Findings from this study highlight knowledge gaps related to identifying risk factors for anaphylaxis. While the majority were aware that peanut and tree nut allergy and a history of previous severe reaction were risk factors for food-induced anaphylaxis, fewer knew that individuals with asthma of any severity are at increased risk for severe food allergic reactions.[10] In addition, 35% believed that age less than 10 years was a risk factor for severe or fatal allergic reactions to foods, when in fact, adolescents and young adults have been noted to be at high risk due to their increased risk-taking behaviors.[26]

The survey ended with a case of a child with no previous diagnosis of allergy, undergoing acute onset of cutaneous and respiratory symptoms developing during lunch in the school cafeteria. The clinical scenario fulfills the Expert Panel criteria for anaphylaxis.[3] However, fewer respondents chose to administer epinephrine (adrenaline) in this case, presumably because the child did not have a documented history of allergies. Fifteen percent of allied health professionals would opt to first contact a parent to inquire whether the child has known allergies, thus delaying the administration of life-saving medication. It is important to realize that 25% of anaphylactic reactions reported in school settings occur in individuals with no previous history of allergic reactions or anaphylaxis,[27] and often allied health professionals are the first point of contact. In the U.S., the School Access to Emergency Epinephrine Act was passed on November 13, 2013, providing support to states that require having unassigned stock epinephrine (adrenaline) in schools, to allow timely treatment of individuals manifesting signs and symptoms of anaphylaxis despite having no prior diagnosis of allergies.[28] Presently, 46 states in the U.S. have “stock epinephrine (adrenaline) legislation” enacted or pending.[29] Similar laws exist in Canada.

Strengths of this survey include the large number of responders from diverse medical and non-medical backgrounds. The same survey questions were administered to all participants, allowing comparisons of knowledge gaps across different backgrounds. Interestingly,

physicians outperformed the other groups only in a few questions. Furthermore, this is the first survey of anaphylaxis knowledge to be distributed internationally. One other study did compare the responses of parents of food allergic children from the U.S. with parental responses from the Netherlands to a food allergy survey, and found that food allergy knowledge was decreased in parents from the Netherlands as compared to parents from the U.S.[20]

There were several limitations to this study. This was not a standardized, validated survey. It was distributed by Medscape and only registered individuals had access to this educational piece and survey, thus participants may be more interested and educated about medical topics. Furthermore, selection bias is a factor as only interested readers chose to participate. There is not a reliable method for the assessment of non-responder bias in this study. Not all responders answered all the questions; it is possible that those who opted to complete all the questions were better informed and were more confident of their answers. Since this survey was distributed only in English, the results may not be generalizable to people outside the U.S. who do not read English. Furthermore, answering questions correctly in a case scenario does not necessarily translate to what would be done in an actual event.

Despite limitations, these results demonstrate that improved education of the diagnosis and management of food-induced anaphylaxis would be beneficial for medical and non-medical people. Our hope and expectation of this improved knowledge base would be better clinical outcomes for individuals at risk for anaphylaxis particularly for children in school settings, as well as greater community awareness of food allergy as a potentially fatal medical disorder.

Identifying and addressing the gaps in knowledge regarding diagnosis and management of anaphylaxis is particularly important given the increasing prevalence of food allergies in young children.[2] Practice guidelines and educational resources for anaphylaxis management exist and are publically accessible on the websites of the American Academy of Allergy, Asthma & Immunology (AAAAI), Food Allergy Research & Education (FARE), and Consortium of Food Allergy Research (CoFAR). The multiple vulnerabilities of young children at risk for anaphylaxis mandate that these educational efforts be aimed not only at the medical community but for the entire child caregiver community and general public, to ensure safety and optimize good health.

Acknowledgement

We thank Medscape for posting the survey and collecting the survey results: Wang J, Young M, Nowak-Wegrzyn A. Food-induced anaphylaxis: keeping kids safe [survey]. Medscape Pediatrics. July 18, 2013. http://www.medscape.com/viewarticle/807786

Financial Disclosure Statement:

Julie Wang, MD is funded in part by a grant from the National Institutes of Health/National Institute of Allergy and Infectious Diseases (K23 AI083883).

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Table 1

Results for each provider or caregiver type. Correct answered are bolded.

A. Identifying anaphylaxis and risk factors

	% choosing each answer					
	All responders	**Physicians**	**Allied health**	**Non-health**	**Other health**	**Medical student**
1. For which of the following cases would you strongly consider anaphylaxis as the diagnosis? Check all that apply.	n=7692	N=2882	N=4057	N=72	N=349	N=332
a. 10 year old reports acute onset of pruritic rash and complains he can't catch his breath while at a school party	6721 (87.4)	2446 (84.9)	3634 (89.6)	62 (86.1)	314 (90.0)	265 (79.8)
b. 5 year old with hives, started with fever and cough 3 days ago, family reports no new foods or exposures	148 (1.9)	30 (1.0)	105 (2.6)	1 (1.4)	7 (2.0)	5 (1.5)
c. 6 year old with hives on his hands after playing with ice for a science experiment, he says the same thing happened when he was playing in the snow this winter	284 (3.7)	70 (2.4)	178 (4.4)	3 (4.2)	16 (4.6)	17 (5.1)
d. 7 year old with peanut allergy ate a cookie from a friend and complained of feeling lightheaded, nurse noted her BP to be 80/60, no other symptoms	4352 (56.7)	1756 (60.9)	2199 (54.2)	49 (68.1)	163 (46.7)	185 (55.7)
2. Risk factors for severe / fatal allergic reactions to foods include – select all that apply	n=5692	N=2214	N=2943	N=61	N=228	N=246
a. Age younger than 10 years	1991 (35.0)	592 (26.7)	1193 (40.5)	18 (29.5)	87 (38.2)	101 (41.1)
b. Allergy to peanut/tree nuts	4975 (87.4)	1869 (84.4)	2659 (90.4)	57 (93.4)	207 (90.8)	183 (74.4)
c. Asthma of any severity	3592 (63.1)	1203 (54.3)	2080 (70.7)	48 (78.7)	141 (61.8)	120 (48.8)
d. History of previous severe reactions	5251 (92.3)	2054 (92.8)	2720 (92.4)	56 (91.8)	211 (92.5)	210 (85.4)
e. Severe asthma	2513 (44.1)	1081 (48.8)	1197 (40.7)	30 (49.2)	100 (43.9)	105 (42.7)

B. Case questions: A 7-year-old girl with known peanut allergy was given 1 peanut on the playground during a school recess break by another child who was unaware of her severe allergies. Shortly after eating the peanut, she felt unwell and asked the teacher for help.

The teacher walked the child to the nurse's office. She has been struggling to breathe when she arrived in the clinic.

	% choosing each answer					
	All responders	**Physicians**	**Allied health**	**Non-health**	**Other health**	**Medical student**
3. What is the most appropriate treatment at this time?	n=4115	N=1716	N=2055	N=49	N=142	N=153
a. Administer albuterol	74 (1.6)	39 (1.9)	24 (1.2)	0	1 (0.7)	10 (6.5)
b. Administer diphenhydramine	37 (0.9)	8 (0.5)	23 (1.1)	0	4 (2.8)	2 (1.3)
c. Administer epinephrine autoinjector and call 911	3927 (95.4)	1648 (96.0)	1964 (95.6)	49 (100)	133 (93.7)	133 (86.9)

B. Case questions: A 7-year-old girl with known peanut allergy was given 1 peanut on the playground during a school recess break by another child who was unaware of her severe allergies. Shortly after eating the peanut, she felt unwell and asked the teacher for help.

The teacher walked the child to the nurse's office. She has been struggling to breathe when she arrived in the clinic.

	% choosing each answer					
	All responders	**Physicians**	**Allied health**	**Non-health**	**Other health**	**Medical student**
d. Call parents	48 (1.2)	13 (0.8)	28 (1.4)	0	3 (2.1)	4 (2.6)
e. Call pediatrician to determine best treatment	30 (0.7)	13 (0.8)	12 (0.6)	0	1 (0.7)	4 (2.6)
f. Observation	6 (0.2)	2 (0.1)	4 (0.2)	0	0	0
4. In what situations would epinephrine use be discouraged in a child with symptoms of anaphylaxis?	n=4059	N=1705	N=2012	N=50	N=140	N=152
a. There are no absolute contraindications for epinephrine use for anaphylaxis	3284 (80.9)	1515 (88.9)	1534 (76.2)	35 (70.0)	110 (78.6)	90 (59.2)
b. The child has a history of congenital heart disease	241 (5.9)	40 (2.4)	164 (8.2)	6 (12.0)	10 (7.1)	21 (13.8)
c. The child has an arrhythmia	453 (11.2)	131 (7.7)	258 (12.8)	9 (18.0)	16 (11.4)	39 (25.7)
d. The child has had no prior anaphylaxis	24 (0.6)	9 (0.5)	15 (0.8)	0	0	0
e. The child is taking antidepressant medications	81 (1.4)	10 (0.6)	41 (2.0)	0	4 (2.9)	2 (1.3)
5. After epinephrine (adrenaline) has been administered and 911 called, what should be done at next? (multiple answers were allowed)	n=3869	N=1616	N=1916	N=61	N=132	N=144
a. Give diphenhydramine even if there are no skin symptoms	2155 (55.7)	978 (60.5)	1010 (52.7)	26 (42.6)	64 (48.5)	77 (53.5)
b. Have the child drink some water to help the throat symptoms	85 (2.2)	19 (1.2)	48 (2.5)	10 (16.4)	2 (1.5)	6 (4.2)
c. Have the child walk around to ensure she does not lose consciousness	148 (3.8)	10 (0.6)	105 (5.5)	13 (21.3)	10 (7.6)	10 (6.9)
d. Lay the child down with feet raised	2581 (66.7)	1161 (71.8)	1203 (62.8)	40 (65.6)	80 (60.6)	97 (97.4)
6. What precautions can the school take to minimize the chances for future reactions?	n=3781	N=1573	N=1891	N=50	N=127	N=140
a. Become a nut-free school	489 (12.9)	175 (11.1)	269 (14.2)	6 (12.0)	18 (14.2)	21 (15.0)
b. Implement an individual health care plan (IHP) formulated by the physician, family in collaboration with the school nurse and school staff	3245 (85.8)	1368 (87.0)	1608 (85.0)	44 (88.0)	108 (85.0)	117 (83.6)
c. Instruct students to use hand sanitizers frequently	31 (0.8)	17 (1.1)	12 (0.6)	0	1 (0.8)	1 (0.7)
d. Provide funding for home schooling	16 (0.4)	13 (0.8)	2 (0.1)	0	0	1 (0.7)

C. What about those who have unknown allergies? Or non-students?

8 year old child with no documented history of allergies, presents to the school nurse with diffuse hives, cough, and wheezing that started immediately after having lunch in the cafeteria.

	% choosing each answer					
	All responders	**Physicians**	**Allied health**	**Non-health**	**Other health**	**Medical student**
7. What should be done for this child?	n=3524	N=1477	N=1751	N=50	N=117	N=129
a. Administer diphenhydramine and albuterol	604 (17.1)	283 (19.2)	262 (15.0)	14 (28.0)	21 (18.0)	24 (18.6)
b. Administer (stock) epinephrine and call 911	2294 (65.1)	1074 (72.7)	1044 (59.6)	28 (56.0)	66 (56.4)	82 (63.6)
c. Ask child if he has allergies	155 (4.4)	28 (1.9)	111 (6.3)	3 (6.0)	5 (4.3)	8 (6.2)
d. Call the child's pediatrician for advice	100 (2.8)	25 (1.7)	62 (3.5)	0	9 (7.7)	4 (3.1)
e. Call parent and ask if the child has allergies	371 (10.5)	67 (4.5)	272 (15.5)	5 (10.0)	16 (13.7)	11 (8.5)

* 23% of responders (n=5692) selected all the correct answers

Pediatr Allergy Immunol. Author manuscript; available in PMC 2015 November 01.

Table 2

Results by medical specialty

	General Pediatrics	Allergy and Immunology	Emergency Medicine	Primary care (Internal Medicine, Family Medicine, General Practice)	Other specialties and sub-specialties	Critical care, anesthesia	General surgery and surgical specialties
Total	1725	179	246	214	412	40	64
Question 1							
Total answering	1699	176	240	212	394	39	62
All correct (%)	865 (50.9)	83 (47.2)	113 (47.1)	94 (44.3)	195 (49.5)	22 (56.4)	18 (29.0)
Question 2							
Total answering	1339	149	174	166	306	31	49
All correct (%)	306 (22.9)	32 (21.5)	31 (17.8)	41 (24.7)	72 (23.5)	7 (22.6)	8 (16.3)
Question 3							
Total answering	1041	114	130	135	241	22	33
All correct (%)	996 (95.7)	109 (95.6)	125 (96.2)	130 (96.3)	234 (97.1)	21 (95.5)	33 (100)
Question 4							
Total answering	1031	113	131	135	240	22	33
All correct (%)	930 (90.2)	103 (91.2)	123 (93.9)	118 (87.4)	195 (81.3)	18 (81.8)	28 (84.8)
Question 5							
Total answering	981	109	114	128	229	22	33
All correct (%)	333 (33.9)	36 (33.0)	44 (38.6)	43 (33.6)	64 (27.9)	8 (36.4)	9 (27.3)
Question 6							
Total answering	955	101	111	127	226	22	31
All correct (%)	838 (87.7)	95 (94.1)	99 (89.2)	108 (85.0)	187 (82.7)	16 (72.7)	25 (80.6)
Question 7							
Total answering	901	96	102	118	207	21	32
All correct (%)	659 (73.1)	72 (75.0)	79 (77.5)	85 (72.0)	146 (70.5)	11 (52.4)	22 (68.8)