Epidemiology of rheumatoid arthritis, juvenile idiopathic arthritis and gout in two regions of the Czech Republic in a descriptive population-based survey in 2002-2003

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Abstract

Objective

To estimate the annual incidence and prevalence of rheumatoid arthritis (RA), juvenile arthritis (JIA) and gout in a population based study in two regions of the Czech Republic with total population of 186,000 inhabitants.

Methods

The study was conducted in the Town of Ceske Budejovice and district of Cheb in the Czech Republic (with a total population of 186,000 inhabitants) in the years 2002 and 2003. Incident cases were registered on condition that the definite diagnosis was confirmed according to existing classification criteria during the study period. Prevalence was studied on the basis of identification of established diagnosis from registers of patients of participating rheumatologists and other specialists. They were asked to report all living patients who had been diagnosed before 1st March 2002. Patients were only included in the study if their permanent address was in the selected study area.

Results

Overall, we found 48 incident and 947 prevalent cases of RA among adults (16+ years), 4 incident and 43 prevalent cases of JIA among children (less than 16 years old), and 64 incident and 425 prevalent cases of gout among adults (16+ years). The total annual incidence of RA was 31/100,000 in the adult population aged 16 years and more (95% CI 20 to 42/100,000). The prevalence of RA was 610/100,000 (95% CI 561 to 658/100,000) in the adult population. An annual incidence of gout in adults was 41/100,000 (95% CI 28 to 53/100,000). The prevalence of gout was 300/100,000 (95% CI 266 to 334/100,000). The annual incidence of JIA was 13/100,000 in children less than 16 years old (95%CI 1 to 20/100,000). The prevalence of JIA in children was 140/100,000 (95% CI 117 to 280/100,000).

Conclusion

This study estimates the annual incidence and prevalence rates of RA, gout and JIA in the first population-based survey in the Czech Republic. The rates of RA and JIA compare well with figures reported from other countries; figures in gout seem to be lower than reported elsewhere.

Key words

Epidemiology, incidence, prevalence, rheumatoid arthritis, juvenile idiopathic arthritis, gout.

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Introduction

The knowledge of the occurrence of inflammatory joint diseases in an exactly defined population is an important factor for the planning of rheumatology health care and it contributes to a better understanding of the disease process itself.

The estimated annual incidence of rheumatoid arthritis (RA) in Europe is between 20-45/100,000 and 24-75/100,000 in American Caucasians (1-6). In southern Sweden, the annual incidence of rheumatoid arthritis (RA) has been reported to be 24/100,000 (29/100,000 for women and 18/100,000 for men) (1). In a British study, the annual incidence estimate of RA within the Norwich Health Authority was 30.8/100,000 for women and 12.7/100,000 for men when age-adjusted to the population of England and Wales (2). Both these studies have used the 1987 American College of Rheumatology (ACR) criteria. The highest incidence of RA has been reported among American Indians (7-9). There have also been reports of decline in the incidence of RA in various countries (3, 8, 10), but it has not been proved by other studies (5,11). The prevalence of RA has been reported to be 0.4-3% (5, 12-15) It has been reported to be 0.4-0.5% in northern Norway in 1989 and 1994 (5), 1.16% in women and 0.44% in men in 2001 in the UK (14). Lower prevalence rates have been reported in southern Europe and some non-European populations, for example 0.2% in Yugoslavia (16) and 0.3% in China (17). The highest prevalence (ranging between 0.4-8.2%) has been estimated among American Indians (9, 18).

The annual incidence of gout in Europe and the US was found to be 140-350/100,000 (19-21). In the UK, the incidence of gout was reported about 250-350/100,000 (19). When restricted to first-ever episodes beginning during the study period, the estimates have decreased to 140/100,000 (210 for males and 70 for females) (20). A study based on general practice reports in the UK has reported the prevalence of gout to be 26% overall in adults (61 in males and 1% in females) (19). However, the occurrence varies in different ethnic groups (22-25). The annual incidence of gout has been found to be increasing, and the disease tending to start at an earlier age (26-27).

A wide range in incidence can be seen for juvenile chronic arthritis (JCA) or juvenile rheumatoid arthritis (JRA): 1.3-22.6/100,000 in children under than 16 years old (28-30). Prevalence of JCA in the Caucasian population in a retrospective study in Minnesota using EULAR criteria has been reported to be 10.5/100,000 (31-32).

In the Czech Republic, medical health care is accessible for the entire population and is overseen by the government. The country is divided into 14 regions containing 70 smaller districts. Typically, there are state hospitals and private ambulant practices in most of the districts. Several general practitioners represent primary health care in each district. Patients with specific symptoms are referred to a private specialist or, with more severe illness, to a hospital within the district. General practitioners should recommend examination by a specialist but the patient can also seek the specialist health care without recommendation. Access to specialist health care is easily available to every patient.

Patients with early inflammatory joint diseases are initially treated by general practitioners. Gout is basically treated at the primary care level. All cases of early arthritis, acute or sub acute polyarthritis are referred to rheumatologists to confirm the diagnosis and to consider appropriate therapy as soon as possible. In general, patients with ongoing inflammatory joint symptoms and patients with a confirmed diagnosis of inflammatory joint disease stay in the further care of rheumatologists. Should the assessment of the definite diagnosis be complicated or some special laboratory investigations are needed, the patient is referred to the Institute of Rheumatology in Prague (according to normal practice).

There have been no known epidemiological data on these diseases in the Czech Republic until 2002. A project of Clinical database/national register of rheumatic diseases started at the

Institute of Rheumatology in Prague in 2000. A part of the project is the population-based study described in this paper. The aim of this population-based study was to estimate the annual incidence and prevalence of rheumatoid arthritis, juvenile rheumatoid arthritis and gout in two districts of the Czech Republic between March 2002 and March 2003.
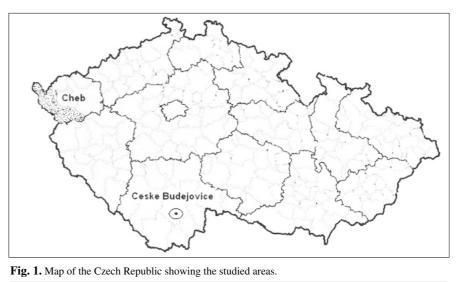
Patients and methods

Study population

Two regions of the Czech Republic with a similar number of inhabitants were chosen: city of Ceske Budejovice and the rural district of Cheb (Fig 1) with a total population of 186,077 inhabitants (97,339 in Ceske Budejovice and 88,738 in the Cheb district). 154,374 of them were 16 years old and more, and 31,703 children were younger than 16 years at the time of study. Census data from 2001 were used as basic population data. The population in both regions is mostly Caucasian and is relatively stable. The chosen areas represent an urban (Ceske Budejovice) and a rural population (Cheb district) of the country. There were several reasons for the selection of these particular study areas: all rheumatologists working in both regions were interested in this project, each of the areas was easy to define and there were only a small number of hospitals or other medical facilities in each region. These factors enabled better cooperation and helped to avoid missing patients.

The city of Ceske Budejovice is the center of the South Bohemia region with one large hospital designed to serve patients in the whole region. There are seven practicing rheumatologists in the city; all of them participated in the study. Two rheumatologists worked at the time of the study in the above mentioned hospital at the rheumatology department and one rheumatologist worked at the pediatric department. Four remaining rheumatologists worked as private practicing specialists.

In the Cheb district, there are two practicing private rheumatologists and both of them participated in the study. There are also three local hospitals in the

Fig. 1. Map of the Czech Republic showing the studied areas.

district: in the towns of Cheb, As, and Marianske Lazne. Because of the absence of a rheumatology department in each of them, special care is guaranteed by the above mentioned practicing rheumatologists.

In both regions combined, there were 64 general practitioners at the time of the study: 37 in Ceske Budejovice and 27 in the Cheb district. Seven practitioners refused to participate in the study for time reasons (2 in Ceske Budejovice and 5 in the Cheb district).

Incidence estimates

All patients with suspect symptoms were referred by their general practitioners, pediatricians, practicing specialists (orthopedics, internists) and collaborating hospital departments where patients with inflammatory joint disease could be found (orthopedics, department of internal medicine, surgery, pediatrics) to the cooperating rheumatologists in both districts. Patients were then registered as incident cases if the diagnosis was confirmed according to existing classification criteria during the 12 month study period (between 1 March 2002 and 1 March 2003). Patients were asked to determine the year and month of the symptoms onset. In addition, specific personal data were obtained to exclude duplicities (informed consent was needed). Only collaborating rheumatologists were allowed to determine the definite diagnosis and to register a new patient with RA or JIA. Because gout is

usually diagnosed and treated by general practitioners, they were allowed to register the patients fulfilling the classification criteria. Before starting the study all general practitioners, pediatricians, practicing specialists, and doctors working in the above mentioned specialized units of the hospitals were informed about the study by the investigators: they were invited to the seminar and were given written information about the study. The participating rheumatologists were instructed to use unified classification criteria and to fill in the form for each registered case. One of the investigators stayed six months in each region to encourage the participating physicians continuously and to give methodological advice when needed. This investigator also tried to estimate reporting bias by going through all patient files of all participating rheumatologists in the study and contacting specialists in neighbouring districts and country central specialist institute in Prague (in an attempt to find patients living in the study area but treated elsewhere). The data were collected monthly.

All the patients defined as having rheumatoid arthritis fulfilled the 1987 ACR (American College of Rheumatology) criteria (33) applied cumulatively as recommended (2).

Patients registered as having gout fulfilled the Wallace criteria (34). Presence of 6 of the 11 criteria yields a specificity of 93% against pseudogout and sensitivity of 85% (35). As gout is

a recurrent condition, only patients with the first-ever episode of acute primary or secondary gout were registered as incident cases.

The revised Durban 1997 classification criteria were used to diagnose JIA in children younger than 16 years (36).

Prevalence estimates
Prevalence was studied on the basis of identification of established diagnosis from registers of the patients of collaborating rheumatologists, other practicing specialists and general practitioners. They were asked to report all living patients, who had been diagnosed before 28 February 2002. One of the investigators personally evaluated the patient-files in the registers of all participating rheumatologists (only two registers were not fully computerized). General practitioners and practicing specialists were visited by this investigator and asked to report the patients in written form. It was not possible to guarantee the proper fulfilment of classification criteria in all reported cases that had been diagnosed before the beginning of the study.

The next condition of registering the patients in both parts of the survey (monitoring of incidence and prevalence) was to have a permanent address in precisely defined regions. Recent Census 2001 data were used to get basic demographic information. Migration rates in both regions were low and the population was stable.

Procedures to improve case finding
Several procedures to minimize bias were performed. To minimize loss of patients (underreporting), we informed medical centers and specialists outside the selected study area which patients with inflammatory joint disease living in some of studied districts might visit. Patients coming from studied regions diagnosed at the Institute of Rheumatology in Prague (country central specialist institute) were also found by one of the investigators and registered as cases. There was no rheumatologist refusing cooperation in the study area. To minimize selection bias and diagnostic misclassification, all collaborators in both districts underwent a short training session in symptoms assessment. Participating rheumatologists were instructed to use unified classification criteria and were continuously encouraged and assisted. Only rheumatologists were allowed to determine the definite diagnosis and register new RA and JIA patients.

Statistical analysis
The estimates were calculated with 95% confidence intervals (95% CI). Standardised rates were calculated in Stata 8 statistical package (Stata Corporation, College Station, USA), and we used European standard population as standard.

Results
A total of 1531 patients were diagnosed as having RA, JIA or gout. One hundred and sixteen patients with a new joint disease were found in the year of the study and were registered as incident cases for these diagnoses.

Nine hundred and ninety-five patients were found as having RA. 48 patients fulfilled criteria for incident RA. This gave a total annual incidence for RA in both districts of 31/100,000 in adult population aged 16 years and more (95% CI 20 to 42/100,000). Among incident cases, 34 patients were women

Table I. Age-specific incidence and prevalence rates* of rheumatoid arthritis.

Age group	Ceske Budejovice			Cheb			Both areas		
	Population	Incident cases N (Rate/100,000)	Prevalent cases N (Rate/100,000)	Population	Incident cases N (Rate/100,000)	Prevalent cases N (Rate/100,000)	Population	Incident cases N (Rate/100,000)	Prevalent cases N (Rate/100,000)
Men									
16-19	2552	0	1 (39.2)	2472	0	0	5024	0	1 (19.9)
20-29	8036	0	2 (24.9)	7783	0	3 (38.5)	15819	0	5 (31.6)
30-39	6824	0	7 (102.6)	6199	0	7 (112.9)	13023	0	14 (107.5)
40-49	7278	1 (13.7)	14 (192.4)	6768	1 (14.8)	12 (177.3)	14046	2 (14.2)	26 (185.1)
50-59	6689	1 (14.9)	32 (478.4)	6252	2 (32.0)	26 (415.9)	12941	3 (23.2)	58 (448.2)
60-69	3762	3 (79.7)	25 (664.5)	3332	1 (30.0)	19 (570.2)	7094	4 (56.4)	44 (620.2)
70-79	2048	1 (48.8)	11 (537.1)	1695	0	13 (767)	3743	1 (26.7)	24 (641.2)
80+	1252	1 (79.9)	5 (399.4)	964	2 (207.5)	6 (622.4)	2216	3 (135.4)	11 (496.4)
Total	38441	7 (18.2)	97 (252.3)	35465	6 (16.9)	86 (242.5)	73906	13 (17.6)	183 (247.6)
Women									
16-19	2446	0	5 (204.4)	2243	0	3 (133.7)	4689	0	8 (170.6)
20-29	7887	0	9 (114.1)	7637	1 (13.1)	7 (91.7)	15524	1 (6.4)	16 (103.1)
30-39	6975	1 (14.3)	17 (243.7)	6114	0	14 (229)	13089	1 (7.6)	31 (236.8)
40-49	7425	2 (26.9)	50 (673.4)	6614	1 (15.1)	54 (816.4)	14039	3 (21.4)	104 (740.8)
50-59	7303	5 (68.5)	109 (1492.5)	6430	2 (31.1)	104 (1617.4)	13733	7 (51.0)	213 (1551)
60-69	4589	7 (152.5)	89 (1939.4)	3880	6 (154.6)	103 (2654.6)	8469	13 (153.5)	192 (2267.1)
70-79	2985	3 (100.5)	86 (2881.1)	2682	3 (111.9)	78 (2908.3)	5667	6 (105.9)	164 (2893.9)
80+	2670	2 (74.9)	17 (636.7)	2058	2 (97.2)	19 (923.2)	4728	4 (84.6)	36 (761.4)
Total	42280	20 (47.3)	382 (903.5)	37658	15 (39.8)	382 (1014.4)	79938	35 (43.8)	764 (955.7)

* Incident cases – cases diagnosed between 1 March 2002 and 1 March 2003; prevalent cases - cases diagnosed before 1 March 2002.

Table II. Age-specific incidence and prevalence[*] rates of gout.

Age group	Ceske Budejovice			Cheb			Both areas		
	Population	Incident cases N (Rate/100,000)	Prevalent cases N (Rate/100,000)	Population	Incident cases N (Rate/100,000)	Prevalent cases N (Rate/100,000)	Population	Incident cases N (Rate/100,000)	Prevalent cases N (Rate/100,000)
Men									
16-19	2552	0	0	2472	0	0	5024	0	0
20-29	8036	0	4 (49.8)	7783	0	2 (25.7)	15819	0	6 (37.9)
30-39	6824	3 (44.0)	12 (175.8)	6199	1 (16.1)	10 (161.3)	13023	4 (30.7)	22 (168.9)
40-49	7278	6 (82.4)	40 (549.6)	6768	3 (44.3)	32 (472.8)	14046	9 (64.1)	72 (512.6)
50-59	6689	8 (119.6)	73 (1091.3)	6252	9 (144.0)	60 (959.7)	12941	17 (131.4)	133 (1027.7)
60-69	3762	7 (186.1)	34 (903.8)	3332	5 (150.1)	36 (1080.4)	7094	12 (169.2)	70 (986.7)
70-79	2048	3 (146.5)	32 (1562.5)	1695	2 (118.0)	16 (944.0)	3743	5 (133.6)	48 (1282.4)
80+	1252	3 (239.6)	5 (399.4)	964	1 (103.7)	4 (414.9)	2216	4 (180.5)	9 (406.1)
Total	38441	30 (78.0)	200 (520.3)	35465	21 (59.2)	160 (451.1)	73906	51 (69.0)	360 (487.1)
Women									
16-19	2446	0	0	2243	0	0	4689	0	0
20-29	7887	0	0	7637	0	0	15524	0	0
30-39	6975	0	2 (28.7)	6114	0	1 (16.4)	13089	0	3 (22.9)
40-49	7425	1 (13.5)	1 (13.5)	6614	1 (15.1)	1 (15.1)	14039	2 (14.2)	2 (14.2)
50-59	7303	3 (41.1)	10 (136.9)	6430	2 (31.1)	6 (93.3)	13733	5 (36.4)	16 (116.5)
60-69	4589	1 (21.8)	9 (196.1)	3880	2 (51.5)	10 (257.7)	8469	3 (35.4)	19 (224.3)
70-79	2985	1 (33.5)	15 (502.5)	2682	1 (37.3)	3 (111.9)	5667	2 (35.3)	18 (317.6)
80+	2670	1 (37.5)	4 (149.8)	2058	0	3 (145.8)	4728	1 (21.2)	7 (148.1)
Total	42280	7 (16.6)	41 (97.0)	37658	6 (15.9)	24 (63.7)	79938	13 (16.3)	65 (81.3)

[*] Incident cases – cases diagnosed between 1 March 2002 and 1 March 2003; prevalent cases - cases diagnosed before 1 March 2002.

Table III. Age-specific incidence and prevalence[*] rates of juvenile idiopathic arthritis.

Age group	Ceske Budejovice			Cheb			Both areas		
	Population	Incident cases N (Rate/100,000)	Prevalent cases N (Rate/100,000)	Population	Incident cases N (Rate/100,000)	Prevalent cases N (Rate/100,000)	Population	Incident cases N (Rate/100,000)	Prevalent cases N (Rate/100,000)
Men									
0-4	2071	0	0	2046	0	0	4117	0	0
5-15	6448	2 (31.0)	1 (15.5)	5884	0	2 (34.0)	12332	2 (16.2)	3 (24.3)
16-19	2552	0	2 (78.4)	2472	0	0	5024	0	2 (39.8)
20-29	8036	0	5 (62.2)	7783	0	3 (38.5)	15819	0	8 (50.6)
30-39	6824	0	2 (29.3)	6199	0	0	13023	0	2 (15.4)
40-49	7278	0	0	6768	0	0	14046	0	0
50-59	6689	0	0	6252	0	0	12941	0	0
60-69	3762	0	0	3332	0	0	7094	0	0
70-79	2048	0	0	1695	0	0	3743	0	0
80+	1252	0	0	964	0	0	2216	0	0
Total	46960	2 (4.3)	10 (21.3)	43395	0	5 (11.5)	90355	2 (2.2)	15 (16.6)
Women									
0-4	1945	0	1 (51.4)	2016	0	0	3961	0	1 (25.2)
5-15	6154	2 (32.5)	4 (65.0)	5669	0	4 (70.6)	11823	2 (16.9)	8 (67.7)
16-19	2446	0	6 (245.3)	2243	0	2 (89.2)	4689	0	8 (170.6)
20-29	7887	0	4 (50.7)	7637	0	2 (26.2)	15524	0	6 (38.6)
30-39	6975	0	2 (28.7)	6114	0	1 (16.4)	13089	0	3 (22.9)
40-49	7425	0	0	6614	0	1 (15.1)	14039	0	1 (7.1)
50-59	7303	0	1 (13.7)	6430	0	0	13733	0	1 (7.3)
60-69	4589	0	0	3880	0	0	8469	0	0
70-79	2985	0	0	2682	0	0	5667	0	0
80+	2670	0	0	2058	0	0	4728	0	0
Total	50379	2 (4.0)	18 (35.7)	45343	0	10 (22.1)	95722	2 (2.1)	28 (29.3)

[*] Incident cases – cases diagnosed between 1 March 2002 and 1 March 2003; prevalent cases - cases diagnosed before 1 March 2002.

and 14 were men, giving the sex specific crude incidence of 43.7 (95% CI 18 to 57/100,000) and 18.3/100,000 (95% CI 1 to 27/100,000), respectively. The incidence figure calculated for the entire population of both districts was 26/100,000 (95% CI 16 to 36/100,000). Age-sex specific incidence rates are reported in Table I. Standardised incidence rates did not substantially differ from crude incidence rates (because the age structure of study districts was similar to European standard population). The standardised incidence rates for men and women are shown in Table IV. All patients were of white Caucasian origin. The mean age at diagnosis was 56 years (SD 16 years). Fulfilling of classification criteria are summarized in Table V. Sixteen patients were not able to state the month of symptom onset; the median duration of symptom onset to inclusion in the study (definite diagnosis of RA) was 4 months (range 0-24) among 32 remaining patients. Thirty patients (62.5%) described their difficulties in the beginning of RA as arising fast and 18 patients (37.5%) as creeping. In 8 incident patients (16.7%) radiographic changes at the cervical part of spine were found during the year of observation. None of the incident patients had had a joint replacement.

There were 947 RA cases diagnosed before 1 March 2002. This gave a point prevalence of 610/100,000 (95% CI 561 to 658/100,000) among individuals aged 16 years and more (0.61%). There were 730 women and 217 men among prevalent cases; the women-to-men ratio was 3.4:1. Age-sex specific prevalence is summarized in Table I. Age-standardized prevalence is presented in Table IV.

There were 489 patients with gout. Of these, 64 patients were diagnosed as having the first episode of acute primary or secondary gout (according to the Wallace criteria) within the year of observation, giving an annual incidence of 41/100,000 in the adult population aged 16 years or more (95% CI 28 to 53/100,000). The incidence figure for the entire population was calculated to be 34/100,000 (95% CI 23 to 46). There were 52 men and 12 women among incident cases, giving the sex

Table IV. Age-standardised incidence and prevalence of RA, gout and JIA (per 100,000).

	Incidence			Prevalence		
	Ceske Budejovice	Cheb	Both areas	Ceske Budejovice	Cheb	Both areas
Rheumatoid arthritis						
Children (0-15 years only)						
Men	-	-	-	-	-	-
Women	-	-	-	-	-	-
Adults only (16+)						
Men	19.3	16.8	18.1	262.0	259.2	260.1
Women	44.8	37.8	41.5	877.0	1002.1	934.4
Whole population						
Men	15.0	13.1	14.1	204.4	202.2	202.9
Women	34.9	29.4	32.4	684.0	781.6	728.8
Gout						
Children (0-15 years only)						
Men	-	-	-	-	-	-
Women	-	-	-	-	-	-
Adults only (16+)						
Men	79.6	62.4	71.6	535.7	474.2	506.9
Women	14.9	16.2	15.5	89.1	61.8	76.1
Whole population						
Men	62.1	48.7	55.9	417.9	369.9	395.4
Women	11.6	12.7	12.1	69.5	48.2	59.4
Juvenile idiopathic arthritis						
Children (0-15 years only)						
Men	19.7	0	10.3	9.9	21.6	15.5
Women	20.7	0	10.8	60.1	44.9	52.2
Adults only (16+)						
Men	-	-	-	-	-	-
Women	-	-	-	-	-	-
Whole population						
Men	4.3	0	2.3	20.5	10.2	15.4
Women	4.5	0	2.4	43.3	24.2	34.0

specific incidence of 69 (95% CI 61 to 78/100,000), and 15/100,000 (95% CI 1 to 23/100,000) among adult men and women respectively. The age-sex specific incidence rates are reported in Table II. Age-standardised rates are in Table IV. According to everyday practice the gout was diagnosed not only by rheumatologists but also by general practitioners. 53% of incident cases (n = 34) were diagnosed by general practitioners (fulfilment of the classification criteria had to be documented in written form). The mean age at diagnosis was 58 years with minimum of 31 and maximum of 82 years. The median duration of symptom onset to inclusion in the study was 1 week, minimum 1 day, maximum 15 years. Distribution of joints affected by the first gouty attack is reported in Table VI. Particular information about serum level of uric acid was given in 43 of total of 64 patients but another 3 patients were identified as having hyperuricemia as

well (71%). The median of serum level of uric acid was 423 mmol/l, the maximum 668 mmol/l and the minimum 298 mmol/l. As normal range was used 200-420 mmol/l. Observed causative factors of hyperuricemia are summarized in Table VII.

There were 425 patients who had never had an episode of gout before 1 March 2002. This gave a point prevalence of 300/100,000 (95% CI 266 to 334/-100,000) in the adult population of both districts (0.3%). The men-to-women ratio was 5.3:1 (357:68). The age-sex specific prevalence is summarized in Table II. Age-standardised prevalence is in Table IV. 62% of the prevalent cases were diagnosed by general practitioners (n = 263).

There were 47 children in both districts with JIA. Of these, 4 children younger than 16 years fulfilled the Durban 1997 criteria in the year of the observation, giving the annual incidence of 13/100,000 among the population < 16

Table V. Distribution of fulfilled ACR classification criteria in incident cases of RA.

ACR classification criteria, 1987	Number of patients fulfilling single criteria	% of total of 48 patients
Morning stiffness lasting at least 1 hour	44	91.6
Arthritis of hand joints (persisting at least 6 weeks)	48	100
Symmetric arthritis (persisting at least 6 weeks)	48	100
Arthritis of ≥ 3 joint areas *	45	93.8
Rheumatoid nodules	2	4.2
Rheumatoid factor	29	60.4
Radiography change	28	58.3
Average count of fulfilled criteria in one patient (SD)	5.1 (0.6)	
Median count of fulfilled criteria in one patient (min; max)	5 (4.6)	

* Soft tissue swelling or fluid in 3 of the left or right proximal interphalangeal, metacarpophalangeal, wrist, elbow, knee, ankle, or metatarsophalangeal joints observed by a rheumatologist.

Table VI. Distribution of joints affected by first gouty attack in incident cases of gout.

swollen joint by first gouty attack	number of patients (%)
Metatarsophalangeal (MTP)	32 (50)
Small hand joints	6 (9.3)
Ankle	5 (7.8)
Knee	2 (3.1)
Patients not able to state the joint	19 (29.7)
Total	64 (100)

Table VII. Observed disorders, probable causation of gout in incident cases of gout.

Observed disorders	Number of patients (%)
Enzymatic defect	0 (not examined)
Alcoholism (60g of alcohol/day or more)	8 (12.5)
Relevant therapy (diuretic, acetylsalicylic acid, pyrazinamid)	16 (25)
Renal insufficiency (GF < 0.,5ml/s/1.,73m^2)	3 (4.6) all combined with diuretic therapy
Hemolytic anaemia	0
Neoplasia (solid tumor / lymfoproliferation)	2 (3.1)
Endocrinopathy (hypo- / hyperparathyroidism)	1 (1.6) combined with renal insufficiency and diuretic therapy
Patients exposed to lead	0
Not given information	18 (28.1)
Total	64 (100)

years old (95% CI 1 to 20/100,000). The ratio of girls to boys was 1:1 (2 cases in each sex). Sex specific incidence was 12/100,000 in girls (95% CI 1 to 19/100,000) and 13/100,000 in boys (95% CI 1 to 20/100,000). All incident cases emerged in town of Ceske Budejovice; no new patients were found in the district of Cheb. Clinical and laboratory data are summarized in Table VIII.

There were 43 children diagnosed in both regions before 1 March 2002; this gave a point prevalence of 140/100,000 (95% CI 117 to 280/100,000) of children younger than 16 years (0.14%). Age-specific incidence and prevalence rates of JIA are summarized in Table III. Age-standardised incidence and prevalence of JIA is presented in Table IV.

Ninety-two patients included in the study were not originally reported to the authors but they were either found in the patient-files of cooperating rheumatologists or diagnosed in the Institute of Rheumatology in Prague or registered by a physician outside of study area and registered during the study period. This gave the estimate of a reporting bias of 6%.

Discussion

This is the first descriptive population-based epidemiological study investigating the incidence and prevalence of RA, gout and JIA in two regions of the Czech Republic with total of 186,077 inhabitants. Both districts showed very good cooperation between general practitioners, paediatricians and rheumatologists. All collaborators were adequately informed in various ways and the records were collected regularly. The presence of one of the investigators in the study area improved the quality of the collected data. All emerging problems were resolved in a short time and the collaborators were continuously encouraged. The selection of 2 study areas probably does not allow using estimated incidence and prevalence for the entire population of the Czech Republic. However we selected one urban area and one district with small towns and rural area to try to best represent the whole country with limited resources available for the project. Age-standardisation also allowed making results representative in the terms of age-structure of the selected areas. The social structure of the selected study regions is well comparable to the social structure of the whole country (using data from Census 2001; Czech Statistical Office.

The incidence and prevalence rates of RA compare well with the incidence and prevalence rates reported in recent studies (1, 2). Gender ratios of incident cases were similar in both areas. Due to the methodology patients with "early arthritis" emerging in the study period were not probably detected. Application of ACR criteria is not helpful in searching of RA patients at disease onset (37). Thus the patients with clinical polyarthritis who are not fulfilling the ACR 1987 criteria in one-year observation (which may be too short) were classified as having undifferentiated arthritis and were not included in the study. This may suggest that

Table VIII. Clinical and laboratory data of JIA incident patients.

JIA – forms in incident patients	Polyarthritis – girl	Polyarthritis – girl	Oligoarthritis – boy	Enthesitis related arthritis – boy
Age	5	14	15	13
Family history	negative	RA in 1 parent	negative	negative
Personal history	adenotomia, allergy	bone fracture	negative	negative
Term before falling ill	hepatitis A vaccination	negative	negative	negative
Duration between first symptom and diagnosis	2 months	4 months	8 months	9 months
Non-joint affection	-	-	-	uveitis, sacroiliitis
Laboratory	RF negative	RF negative	RF negative	RF negative B27 positive
Fitness to work	A (full)	A	A	B (limited by hard physical work)

registered patients probably had more severe disease (they fulfilled the criteria sooner). However, Symmons *et al.* (2003) found that fulfilling ACR criteria does not identify patients who are ultimately likely to develop significantly more severe disease (37). The referral of patients with arthritis to the rheumatologists was probably slightly quicker (because of the existence of the study and the pressure from the investigators) than in normal conditions. No difference between the rural and urban region was found. Homogenous population, similar age and social structure of both regions may be likely reasons for this similarity. Other lifestyle factors (such as smoking, drinking of coffee, contraception etc.) were not investigated. Detailed clinical and labour data will be published later.

Gout seems to occur less often in both regions than reported in previous studies elsewhere (19, 20). Only patients with the first-ever episode of gout beginning during the study period were registered as incident cases. We assume several sources of underestimation, in particular due to low compliance of patients with self-limiting disease, which can have a long remission period. Patients might have not searched out medical help in the study period. Gout is usually diagnosed by general practitioners. As described in Methods, there were 7 GPs refusing cooperation in the study, so we probably missed the patients registered with these GPs. Distribution of non-cooperative GPs was not symmetrical and this may have affected the small observed difference between the regions. This fact affected

the occurrence of all investigated diagnoses but occurrence of gout was particularly affected because these practitioners referred every patient with other inflammatory joint disease to the rheumatologists in everyday practice. This may also explain slightly lower occurrence of gout in Cheb district. In addition, problems with fulfilment of required criteria (such as identification of crystals in synovial fluid) for every patient were likely. The population of both regions is similar, according to age and sex-structure, and eating habits are similar to the Europian population. Further investigation would be needed to confirm lower occurence of gout in both districts.

To identify patients with JIA we used the Durban 1997 criteria. Because of the lack of studies using these criteria, it is not easy to compare the occurrence figures with previous findings. However incidence and prevalence rates in JIA seem to be similar to the rates presented in previous studies. All incident cases in the one-year observation came from the urban area. There were no epidemiological reports about an increased number of hepatitis A, parvovirus infection or cases with infectious mononucleosis in this area in the time of the study. In one case there was the development of JIA associated with the hepatitis A vaccination. This vaccination does not come under obligatory vaccinations in the Czech Republic and is given rather seldom. The other JIA incident patients did not have infection or vaccination in their recent past. It was reported in the literature (38) that socioeconomic variables may be

associated with JIA. According to our findings, children living in flats in an urban area had a higher risk of JIA than children living on a farm in a rural area. However, as our study was running for a shorter time than the study from Denmark, the population rather homogenous and the fact that JIA is a rare disease in childhood, we believe that one-year monitoring is too short and may cause such discrepancy. The forms of JIA found in our study come under the most common forms of this disease.

As mentioned in previous section, 92 patients were identified through investigation by one of the authors. These patients were referred neither by rheumatologists nor by general practitioners nor other collaborating specialists from the study area. These patients were reported either by physician practising close to selected regions, or by rheumatologists from the Institute of Rheumatology in Prague, or were found by investigators. The reporting bias calculated from this number is 6%. Collaboration was established with all rheumatologists in both areas. Except seven GPs who declined cooperation for time reasons, all GPs and other specialists also collaborated with the investigators. It is very difficult to estimate the true number of missed incident and prevalent cases in the study but probability that a substantive number of patients with definite diagnosis would escape all these physicians is rather small. However some patients might have been treated in other health facilities in the country. From these reasons, the calculated bias of 6% is probably underestimated. It is very

difficult to estimate the true number of missed incident and prevalent cases in the study but we assume that only a very small proportion of cases was not identified by the investigators.

A letter of approval was used in incident cases and did not cause exclusion of patients from the study. We did not have any patient who was referred to us with a definite diagnosis by a cooperating physician and who refused registration in the study. Incident patients did not have to fill in all requested information from personal or family history, however most of the patients answered all the questions. The extent of the collected data (both questionnaire and clinical data) could not be exhaustive but the main focus of this study was to assess the occurence of selected diagnoses in the predefined study area.

In summary, this study presents the first estimates of incidence and prevalence of RA, gout, and JIA in the Czech Republic (and one of the first estimates in the countries of Central and Eastern Europe) in a population-based survey. The occurrence figures in RA and JIA are consistent with published data; figures in gout seem to be lower than reported elsewhere.

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References

1. SODERLIN MK, BORJESSON O, KAUTIAINEN H, SKOGH T, LEIRISALO-REPO M: Annual incidence of inflammatory joint diseases in a population based study in southern Sweden. *Ann Rheum Dis* 2002; 61: 911-5.
2. WILES N, SYMMONS DP, HARRISON B *et al.*: Estimating the incidence of rheumatoid arthritis. *Arthritis Rheum* 1999; 42: 1339-46.
3. KAIPIAINEN-SEPPANEN O, AHO K, ISOMAKI H, LAAKSO M: Incidence of rheumatoid arthritis in Finland during 1980-90. *Ann Rheum Dis* 1996; 55: 608-11.
4. DORAN MF, POND GR, CROWSON CS, O'FALLON WM, GABRIEL SE: Trends in incidence and mortality in rheumatoid arthritis in Rochester, Minnesota, over forty-year period. *Arthritis Rheum* 2002; 46: 625-31.
5. RIISE T, JACOBSEN BK, GRAN JT: Incidence and prevalence of rheumatoid arthritis in the county of Troms, nothern Norway. *J Rheumatol* 2000; 27: 1386-9.
6. AHO K, KAIPIAINEN-SEPPANEN O, HELIOVAARA M, KLAUKKA T: Epidemiology of rheumatoid arthritis in Finland. *Semin Arthritis Rheum* 1998; 27: 325-34.
7. DEL PUENTE A, KNOWLER WC, PETTIT DJ, BENNETT PH: High incidence and prevalence of rheumatoid arthritis in Pima Indians. *Am J Epidemiol* 1989; 129: 1170-8.
8. JACOBSSON LT, HANSON RL, KNOWLER WC *et al.*: Decreasing incidence and prevalence of rheumatoid arthritis in Pima Indians over a 25 year period. *Arthritis Rheum* 1994; 37: 1158-65.
9. RUBIN LA, VOORNEVELD CR: High prevalence of rheumatoid arthritis among North American Native Indians (NANI): support for the New World theory of RA. *Arthritis Rheum* 1991; 34: 181.
10. SYMMONS DP, BARRETT EM, BANKHEAD CR, SCOTT DG, SILMAN AJ: The incidence of rheumatoid arthritis in the United Kingdom: results from the Norfolk Arthritis Register. *Br J Rheumatol* 1994; 33: 735-9.
11. CHAN KW, FELSON DT, YOOD RA, WALKER AM: Incidence of rheumatoid arthritis in central Massachusetts. *Arthritis Rheum* 1993; 36: 1691-6.
12. ISOMÄKI HA: Prevalence and social impact of rheumatic diseases in Finland. *J Rheumatol* 1983; 10 (Suppl.): 29-33.
13. KNORR U: A panorama of rheumatic diseases. *Versicherungsmedizin* 1994; 46: 212-5.
14. SYMMONS D, TURNER G, WEBB R *et al.*: The prevalence of rheumatoid arthritis in the United Kingdom: new estimates for a new century. *Rheumatology* 2002; 41: 793-800.
15. GABRIEL SE, CROWSON CS, O'FALLON WM: The epidomiology of rheumatoid arthritis in Rochester, Minnesota, 1955-1985. *Arthritis Rheum* 1999; 42: 415-20.
16. STOJANOVIC R, VLAJINAC H, PALICOBRADOVIC D, JANOSEVIC S, ADANJA B: Prevalence of rheumatoid arthritis in Belgrade, Yugoslavia. *Br J Rheumatol* 1998; 37: 729-32.
17. DAI S, HAN X, ZHAO D, SHI Y, LIU Y, MENG J: Prevalence of rheumatic symptoms, rheumatoid arthritis, ankylosing spondylitis, and gout in Shangai, China: a COPCORD study. *J Rheumatol* 2003; 30: 2245-51.
18. BOYER GS, BENEVOLENSKAJA LI, TEMPLIN DW *et al.*: Prevalence of rheumatoid arthritis in cirkumpolar native populations. *J Rheumatol* 1998; 25: 23-9.
19. CURRIE WJ: Prevalence and incidence of the diagnosis of gout in Great Britain. *Ann Rheum Dis* 1979; 38: 101-6.
20. ROYAL COLLEGE OF GENERAL PRACTITIONERS, OFFICE OF POPULATION CENSUSES AND SURVEYS, DEPARTMENT OF HEALTH AND SOCIAL SECURITY: Morbidity statistics from general practice 1981-82. Third National Study, London: HMSO, 1986.
21. ABBOTT RD, BRAND FN, KANNEL WB, CASTELLI WP: Gout and coronary heart disease: the Framingham study. *J Clin Epidemiol* 1988; 41: 237-42.
22. CHANG HY, PAN WH, YEH WT, TSAI KS: Hypeuricemia and gout in Taiwan: Results from the Nutritional and Health Survey in Taiwan (1993-96). *J Rheumatol* 2001; 28: 1640-6.
23. GIBSON T, WATERWORTH R, HATFIELD P, ROBINSON G, BREMMEL K: Hyperuricaemia, gout and kidney function in New Zealand Maori men. *Br J Rheumatol* 1984; 23: 276-82.
24. ZIMMET PZ, WHITEHOUSE S, JACKSON L, THOMAS K: High prevalence of hyperuricemia and gout in an urbanised Micronesian population. *Br Med J* 1978; 1: 1237-9.
25. DARMAWAN J, VALKENBURG HA, MUIRDEN KD, WIGLEY RD: The epidemiology of gout and hyperuricemia in a rural population of Java. *J Rheumatol* 1992; 19: 1595-9.
26. PASCUAL E, PEDRAZ T: Gout. *Curr Opin Rheum* 2004; 16: 282-6.
27. CHEN SY, CHEN CL, SHEN ML, KAMATANI N: Trends in the manifestation of gout in Taiwan. *Rheumatology* 2003; 12: 1529-33.
28. ANDERSSON GARE B: Juvenile arthritis - Who gets it, where and when? A review of current data on incidence and prevalence. *Clin Exp Rheumatol* 1999; 17: 367-74.
29. SYMMONS DP, JONES M, OSBORNE J, SILLS J, SOUTHWOOD TR, WOO P: Pediatric rheumatology in the United Kingdom. Data from the British Pediatric Rheumatology Group. National Diagnostig Register. *J Rheumatol* 1996; 23: 1975-80.
30. KOSKULL S, TRUCKENBRODT H, HOLLE R, HARMANN A: Incidence and prevalence of juvenile arthritis in an urban population of southern Germany: a prospective study. *Ann Rheum Dis* 2001; 60: 940-5.
31. WOOD PHN: Special meeting on nomenclature and classification of arthritis in children. *In*: MUNTHE E. (Ed.): *The care of rheumatic children*. Basel, EULAR Publishers 1978:47-50.
32. PETERSON LS, MASON AM, O'FALLON WM, GABRIEL SE: Juvenile rheumatoid arthritis in Rochester, Minnesota 1960-1993. *Arthritis Rheum* 1996; 39: 1385-90.
33. ARNETT FC, EDWORTHY SM, BLOCH DA *et al.*: The American Rheumatism Assotiation 1987 revised criteria for the classification of rheumatoid arthritis. *Arthritis Rheum* 1988; 31: 315-24.
34. WALLACE SL, ROBINSON H, MASI AT, DECHER JL, McCARTY DJ, YU TF: Preliminary criteria for the classification of the acute arthritis of primary gout. *Arthritis Rheum* 1977; 20: 859-900.
35. STEWART OJ, SILMAN AJ: Gout. *Br J Rheumatol* 1990; 29: 485-8.
36. PETTY RE, SOUTHWOOD TR, BAUM J *et al.*: Revision of the proposed classification criteria for juvenile idiopathic arthritis: Durban, 1997. *J Rheumatol* 1998; 25: 1991-5.
37. SYMMONS DP, HAZES JM, SILMAN AJ: Cases of early inflammatory polyarthritis should not be classified as having rheumatoid arthritis. *J Rheumatol* 2003; 30: 902-4.
38. NIELSEN HE, DORUP J, HERLIN T, LARSEN K, NIELSEN S, PEDERSEN FK: Epidemiology of juvenile chronic arthritis: risk dependent on sibship, parental income, and housing. *J Rheumatol* 1999; 26: 1600-5.