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Title: Epidemiology of musculoskeletal pain in children and young people between 2005-2021: an electronic primary health care record study

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Abstract

Background: Pain in childhood is common, and is linked to adult musculoskeletal pain, but there is an information gap on initial care seeking. Our aim was to determine trends and variations in the consultation prevalence and incidence of musculoskeletal pain, and most common sites of pain, in children and young people presenting to UK primary care.

Methods: A national UK primary care database (CPRD Aurum) was used to determine annual prevalence and incidence of consultation for musculoskeletal pain in children and young people (aged 8-18 years) between 2005-2021. Incidence was defined as no musculoskeletal consultation in the previous calendar year. Rates were calculated per 10,000 registered population for each calendar year and by age, gender, and body site.

Results: 1,175,641 children and young people (49% female; median age 12) consulted primary care for musculoskeletal pain. Annual consultation prevalence for musculoskeletal pain rose from 808/10,000 in 2005 to 980/10,000 in 2011, then remained stable to 2015 before falling slightly. Annual consultation rates were higher for younger and older females, although minimal differences were observed between genders for 12-15 year-olds. Foot/ankle was the most common pain site in younger children, with the knee becoming more common in both genders by age 13. Back pain was the most recorded pain site for females from age 16. Males were more likely to have injury or sprain coded, increasing by age for foot/ankle, hand/wrist, and knee.

Conclusions: Musculoskeletal pain is common in children and young people with nearly one in ten seeking primary health care each year, with different patterns by age, gender and body site.

Understanding the epidemiology of musculoskeletal pain in children and young people presenting to primary care is key due to paucity of information on how to effectively treat and care for this population.

Introduction

Musculoskeletal pain is a leading cause of disability worldwide.(1) Whilst common in adults with up to one in five adults presenting to general practice each year with a musculoskeletal condition (2), musculoskeletal pain is present throughout the life course.(3) For example, observational studies have reported over half of 9 year-olds report pain in the last month,(4) and up to 44% of children and young people (CYP) report chronic pain.(5,6) Back and neck pain are among the top 10 causes of disability globally among 10-14 year-olds, rising to fourth place among 15-19 year-olds, before becoming the leading cause among 25-29 year-olds.(1)

There is evidence that pain in childhood is related to musculoskeletal pain among adults(7–9) but there is an absence of guidance for managing musculoskeletal pain in this group. For example, there is currently no National Institute for Health and Care Excellence (NICE) guidance on treating musculoskeletal pain in CYP, and broader guidelines, such as for back pain or chronic pain, specifically exclude children (under 16 years).(10,11) This is likely to be a reflection of the lack of musculoskeletal pain research in primary care among CYP, with limited evidence on the types of musculoskeletal pain presentations in this setting and how they vary by demographics such as age and gender. Understanding the primary care healthcare seeking behaviours of children and young people with musculoskeletal pain is important because this is the setting where most musculoskeletal problems are identified and managed, and provides a point at which early intervention can effect lasting change.

The aim of this study was to determine trends in the prevalence and incidence of primary care consultations for musculoskeletal pain in CYP, and describe variation by age, gender and site of pain.

Methods

Study Design, Setting and Population

The study utilised the UK Clinical Practice Research Datalink (CPRD) Aurum database. CPRD Aurum contains anonymised primary care electronic health records (EHR) for over 41 million patients from over 1,400 general practices using EMIS Web[®] software, currently covering 19.8% of the UK population.(12,13)

The study was approved by the CPRD Research Data Governance (ref 22_002318). The approved protocol was made available to reviewers.

Denominator Population

Children and young people aged 8-18 years with at least 24 months prior registration at their general practice before 1st January of each calendar year (2005-2021) and a registration end date after the end of year were included in the denominator population for each year. Where registration end dates were missing, the earliest of the practice's last collection date or a patient's death date was used.

Numerator Population

For each calendar year, children and young people fulfilling the denominator population and who had a recorded primary care consultation for musculoskeletal pain in that year were included in the numerator for prevalent consultations. Children and young people could only be included once in each numerator.

Children and young people with a consultation for musculoskeletal pain in the 12 months prior to a primary care consultation for musculoskeletal pain were excluded from both the numerator and denominator population for incident consultations.

In UK primary care, diagnoses and symptoms were recorded using the Read code system up to 2018 and SNOMED CT codes have been used since 2018. Read and SNOMED CT Code lists for musculoskeletal pain were derived from published works (14,15) and reviewed and finalised by consensus of two General Practitioners [FM; JP] and a Specialist Rheumatology and Musculoskeletal Physiotherapist [MJT]).

Musculoskeletal pain consultations were categorised by pain site (arm; back; chest/trunk; elbow; foot/ankle; hand/wrist; head; hip/pelvis; knee; leg; multiple; neck; other; shoulder). The final code list is available at <https://keele.worktribe.com/record.jx?recordid=627751>.

Statistical Analysis

Annual consultation prevalence was calculated overall and by pain site per 10,000 registered persons for each year between 2005 and 2021. This was repeated for incidence, and also stratified by gender, age bands (8-11, 12-15 and 16-18 years; recommended through consultation with a Young Persons Advisory Group as ages of transition in the UK [11-12 years primary to secondary school; 15-16 years leaving secondary school]) and presented also for the 5 most common regional pain sites (back, chest/trunk, foot/ankle, hand/wrist, and knee).

Results

In total there were 1,175,641 children and young people who consulted primary care for musculoskeletal pain between 2005-2021 with 4,112,436 children and young people included in the denominator population (Table 1).

Table 1 - Characteristics of children and young people consulting for musculoskeletal pain between 2005-2021

	Total
Number of individuals in the denominator population, <i>n</i>	4,112,436
Number of consultations for musculoskeletal pain ^a , <i>n</i>	1,945,427
Number of individuals consulting	1,175,641
Median number of consultations (IQR); range	1 (1, 2); 1-11
Gender recorded on consultation, <i>n</i> (%)	
	<i>Female</i> 946,257 (49)
	<i>Male</i> 999,170 (51)
Median age recorded on consultation (IQR), years	12 (10, 14)
Age Bands, <i>n</i> (%)	
	<i>8 to 11 years</i> 565,000 (29)
	<i>12 to 15 years</i> 818,817 (42)
	<i>16 to 18 years</i> 561,610 (29)

^a Individuals may consult more than once

Annual Consultation Rates

Annual consultation prevalence for musculoskeletal pain rose from 808/10,000 in 2005 to 980/10,000 in 2011, then remained stable to 2015 before falling slightly. Prevalence fell further to 58/10,000 in 2020 before rising to 678/10,000 in 2021 (Table S1a). Musculoskeletal pain consultation prevalence was lowest for children aged 8 to 11 years (Table S1a). Prevalence was higher in females than males in the age bands 8-11 and 16-18, but there was less of a difference by gender in those aged 12-15 years (Figure 1 and Tables S1b-S1c).

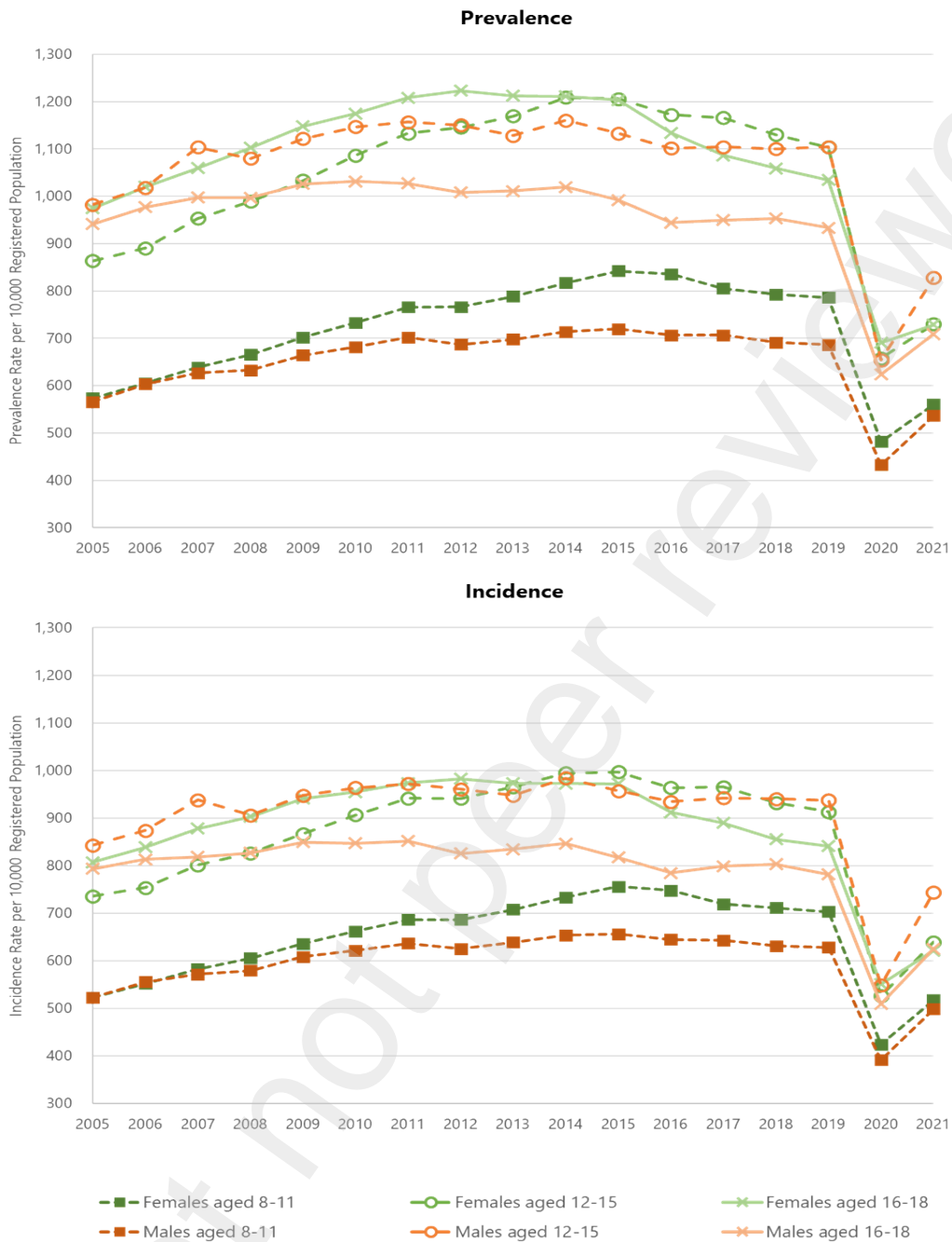


Fig. 1 - Annual rates of MSK consultations by age and gender per 10,000 registered population

A similar trend was observed for annual consultation incidence, with an increase from 699/10,000 in 2005 to 832/10,000 in 2011, stabilising to 2015 before decreasing. Rates in 2020 fell to 486/10,000 before rising to 606/10,000 in 2021 (Table S2a). Consultation incidence was lowest in males aged 8-11 years with similar consultation incidence observed for males and females in the 12-15 age band;

males aged 16-18 years consulted for incident MSK pain less frequently than females aged 16-18 years (Figure 1 and Tables S2b-S2c).

Trends in Consultations by Pain Site

Patterns in trends over time were generally consistent by pain site with the foot/ankle (prevalence 248/10,000 and incidence 198/10,000 in 2019) being the most common body site for consultation overall, followed by knee (169/10,000 and 128/10,000), hand/wrist (155/10,000 and 120/10,000), back (118/10,000 and 88/10,000) and chest/trunk (48/10,000 and 37/10,000; Figure 2, Table S1a and Table S2a).

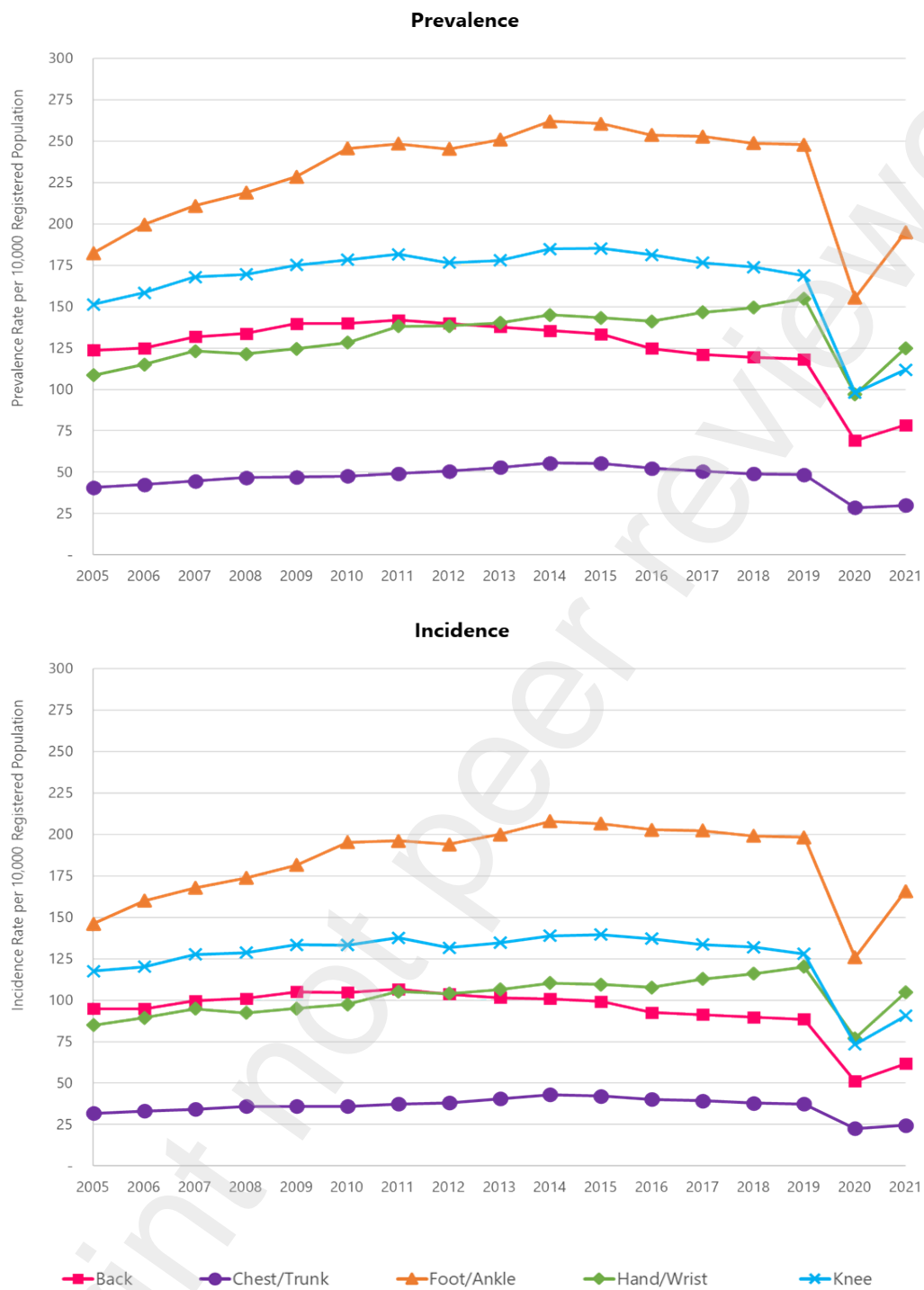


Fig. 2 - Annual rates of most common regional pain site per 10,000 registered population

However, patterns for regional pain sites varied by age and gender. In the age group 8-11, foot/ankle consultation was more than twice as common than any other individual pain site for both males and females up to and including 2019 (Figure 3). But, in females aged 12-15, the gap was smaller with

foot/ankle consultation prevalence about 20% higher than for the knee each year, whilst there was little difference between prevalence of foot/ankle and knee consultation in males. Within age group 16-18 years, the back was the most common pain site for consultation for females; in males, the knee was generally the most common pain site across each year although by 2019 there was little difference in consultation prevalence of knee, foot/ankle, back, and hand/wrist pain.

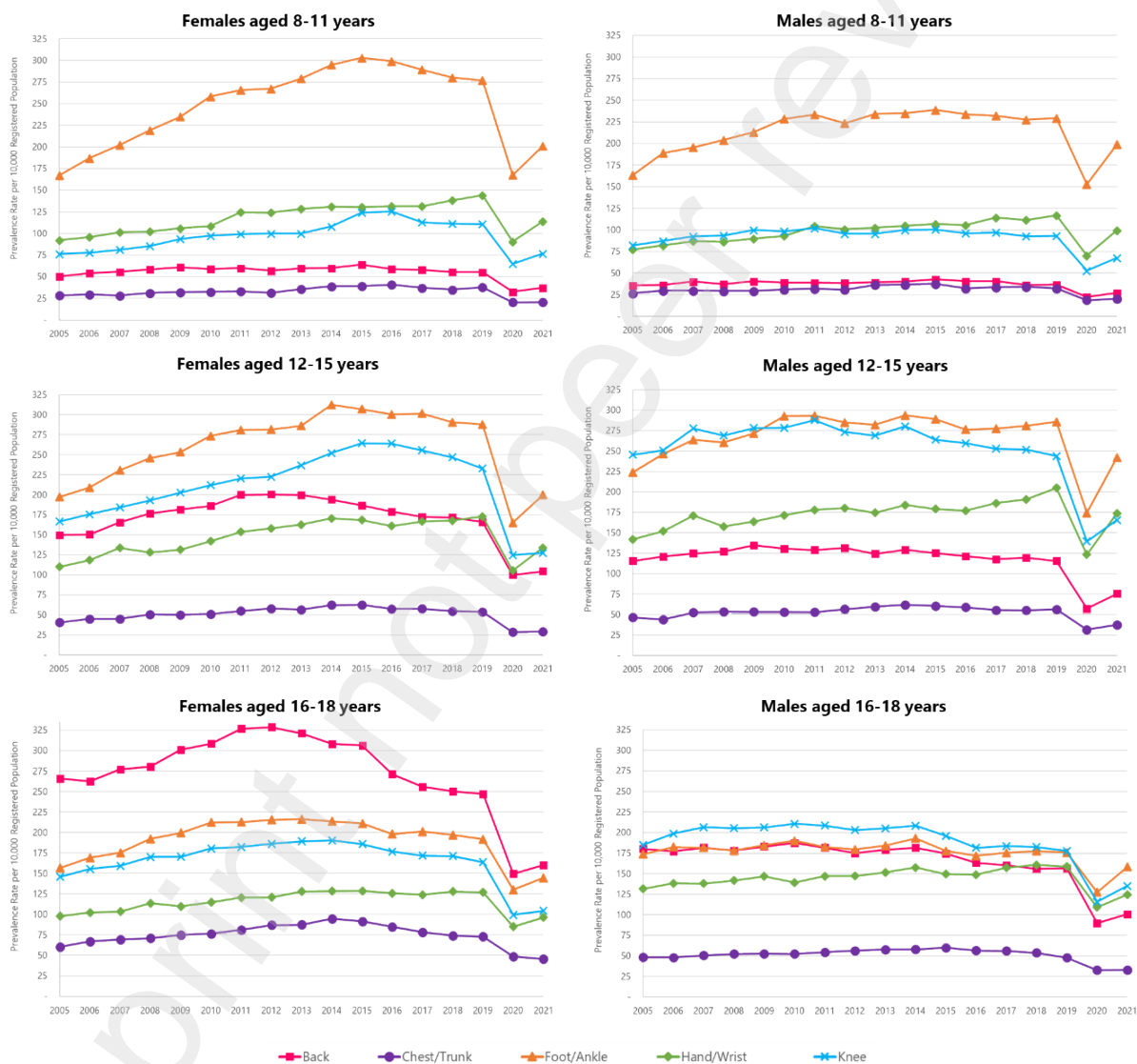


Fig. 3 - Annual Prevalence of pain sites by age and gender per 10,000 registered population

Prevalence and incidence of foot/ankle pain peaked at 10-12 years and at 13-14 years for knee pain in both males and females. Peak prevalence and incidence for hand/wrist was 13-15 years for males and 11-12 years for females (Figure 4). The prevalence and incidence of back and chest/trunk pain rose until age 18 in females while the highest rates occurred at 15 years in males (Figure 4).

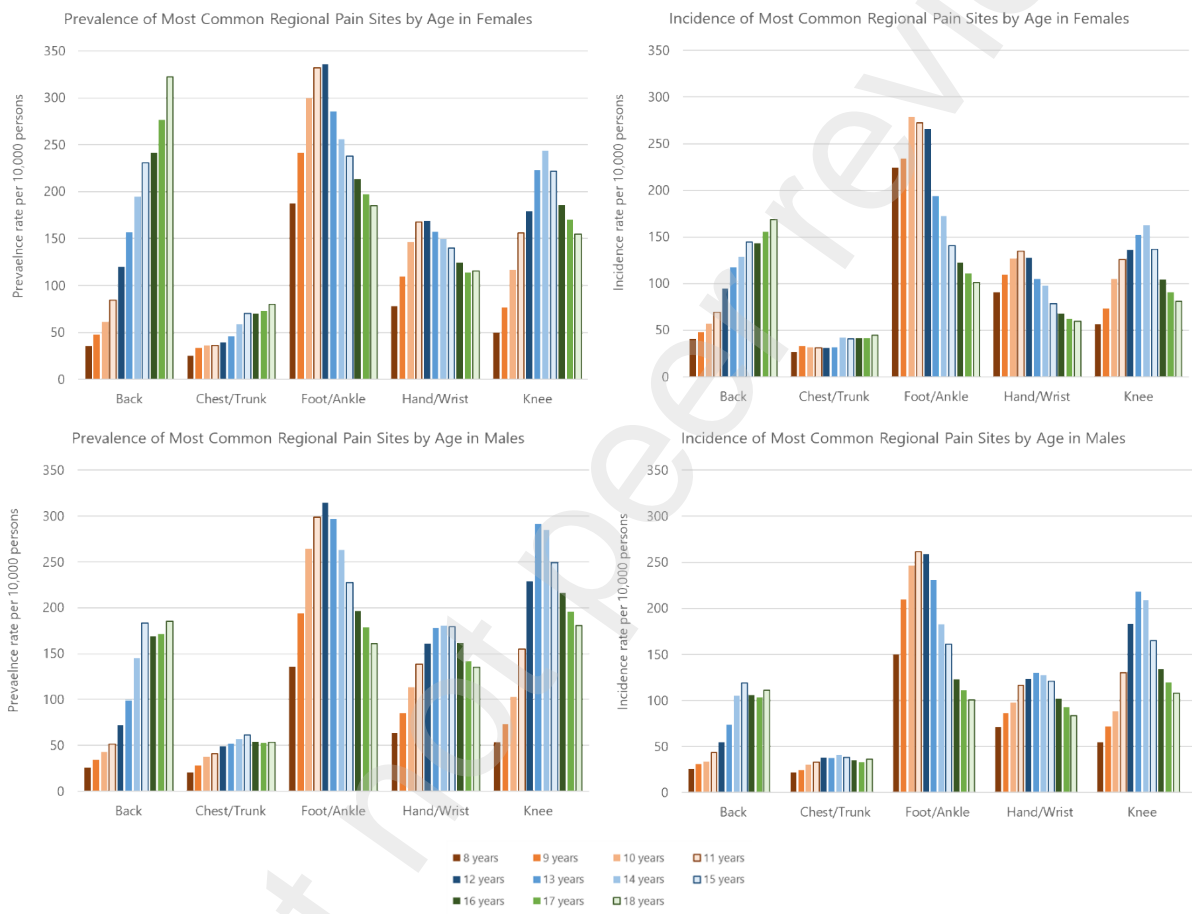


Fig. 4 - Prevalence and Incidence of pain sites by age and gender per 10,000 registered population

Types of Pain

The most frequently used codes for each pain site were “Back pain” and “Low Back pain” (33% and 32% of back codes, respectively), “Musculoskeletal chest pain” (40% of chest/trunk codes), “Foot pain” and “Ankle sprain” (19% and 15% of foot/ankle codes, respectively), “Finger injury” and “Wrist

injury” (18% and 15% of hand/wrist codes, respectively) and “*Knee pain*” (52% of knee codes; Table 2).

Table 2 - Top 10 codes by SNOMED CT Concept ID for the most common painful body sites

Back Pain n=365,646 records	Chest/Trunk Pain n=115,873 records	Foot/Ankle Pain n=624,047 records	Hand/Wrist Pain n=349,364 records	Knee Pain n=491,335 records
Back pain (n=119,443; 33%)	Musculoskeletal chest pain (n=45,827; 40%)	Foot pain (n=116,195; 19%)	Finger injury (n=63,408; 18%)	Knee pain (n=256,053; 52%)
Low back pain (n=118,258; 32%)	Costochondritis (n=25,085; 22%)	Ankle sprain (n=91,149; 15%)	Wrist injury (n=52,245; 15%)	Knee injury (n=53,992; 11%)
C/O - low back pain (n=24,728; 7%)	Rib pain (n=15,950; 14%)	Ankle pain (n=67,200; 11%)	Injury of hand (n=36,258; 10%)	Juvenile osteochondrosis of tibial tubercle (n=53,743; 11%)
Coccygodynia (n=11,245; 3%)	Chest wall pain (n=8,963; 8%)	Foot injury (n=49,872; 8%)	Wrist joint pain (n=23,764; 7%)	Anterior knee pain (n=29,201; 6%)
Idiopathic scoliosis (n=7,609; 2%)	Anterior chest wall pain (n=4,372; 4%)	Ankle injury (n=49,730; 8%)	Wrist sprain NOS (n=23,596; 7%)	Knee sprain (n=17,595; 4%)
Acute thoracic back pain (n=7,516; 2%)	C/O - a chest wall symptom (n=3,962; 3%)	Heel pain (n=34,708; 6%)	Hand pain (n=20,382; 6%)	Chondromalacia patellae (n=11,936; 2%)
Kyphoscoliosis and scoliosis (n=7,378; 2%)	Sprain of costal cartilage (n=2,439; 2%)	Flat foot (n=28,670; 5%)	Thumb injury (n=19,623; 6%)	Dislocation of knee NOS (n=7,345; 1%)
Mechanical low back pain (n=5,532; 2%)	Tietze's disease (n=1,790; 2%)	Toe pain (n=27,652; 4%)	Ganglion of wrist (n=13,804; 4%)	Painful right knee (n=3,478; 1%)
Traumatic and/or non- traumatic injury of back (n=4,542; 1%)	Acquired pectus carinatum (n=1,647; 1%)	Injury of toe (n=25,966; 4%)	Finger pain (n=13,682; 4%)	Swollen knee (n=3,314; 1%)
Pain in lumbar spine (n=4,539; 1%)	Acquired pectus excavatum (n=1,528; 1%)	Achilles tendinitis (n=19,660; 3%)	Pain in thumb (n=9,725; 3%)	Patellar tendinitis (n=3,266; 1%)

* C/O = complaining of; NOS = not otherwise specified.

There were age and gender differences in the top 5 codes for foot/ankle, hand/wrist and knee pain.

Similar proportions of females with foot/ankle consultations across age bands were recorded with foot/ankle pain (24%-27%) or sprain/injury (24%-28%) whereas inverse trends were recorded for males with foot/ankle/heel pain (31% aged 8-11, 20% aged 12-15 and 19% aged 16-18) versus foot/ankle sprain/injury (17% aged 8-11, 27% aged 12-15 and 39% aged 16-18; Tables S3a-S3b).

The most common code for knee was “*Knee pain*” accounting for 42%-54% of records with differences observed by age and gender in the second to fourth codes (“*Knee injury*”; “*Juvenile*

osteochondrosis of tibial tubercle"; *"Anterior knee pain"*); *"Juvenile osteochondrosis of tibial tubercle"* was the second most common code for those aged 12-15 years (21% males; 8% females) while *"Anterior knee pain"* was more common in females (5%-7% versus 4% for all age bands in males; Tables S3a-S3b).

There was little difference by age and gender for back pain with the top 3 codes (*"Low back pain"*; *"Back pain"*; *"C/O low back pain"*) accounting for 48% -56% records and the top 4 codes for chest/trunk pain (*"Musculoskeletal chest pain"*; *"Costochondritis"*; *"Rib pain"*; *"Chest wall pain"*) accounting for 74% -81% records (Tables S3a-S3b).

Discussion

This study using a large nationally representative primary care database of consultation records from over 4.1 million children and young people has shown that nearly one in ten children and young people seek healthcare each year for musculoskeletal pain. Consultation is higher for females in younger children (aged 8-11) and young people (aged 16-18). Consultation in younger children is driven by foot and ankle pain. Whilst knee pain becomes more common in older children, gender variation is seen with the predominance of back pain in older females. There is some evidence that sprain/injury codes are more frequently used in males. The data presented here will inform and underpin future research on the management of musculoskeletal pain in CYP, an area where there is a substantial evidence gap.(16)

Comparison to other studies

This study has shown around one in ten children and young people aged 8-18 present to primary care with musculoskeletal pain each year; with lowest consultation in children aged 8-11. Our results add detail to previous findings using local (North Staffordshire) data which demonstrated that from 5% of 6-9 year-olds to 12% of 14-17 year-olds visit their General Practitioner (GP) annually for musculoskeletal problems,(17) and Canadian research that found 12% of children and young people sought healthcare for musculoskeletal disorders (74% from primary care).(18) A recent study from Sweden reported that over 12-months, 2-3% of 13-18 year olds presented with back/neck pain with 80% occurring in primary care, again consistent with our figure of 118/10,000 in 2019 for back pain in those aged 8-18.(19) Our research also showed that children are more likely to seek healthcare for musculoskeletal consultations as they become older,[15] confirming findings from Australia and Sweden.(19,20) However, by using this large dataset, we have been able to show that this increase with age is not present for all pain sites, and differs by gender, which previous studies have been unable to describe. The distinct rise in healthcare seeking for back pain among older girls has not

previously been demonstrated and warrants further investigation, as it may give insights into the development of back pain, which is the leading cause of disability globally among adults.(1,21)

The fall in consultation prevalence and incidence in 2020 at the time of the COVID-19 pandemic, and the gradual rise in 2021 matches patterns of musculoskeletal consultation found in all age populations.(14,15,22)

The predominance of foot and ankle consultation found in younger children does not match patterns in adults where back pain is generally reported to have the highest prevalence followed by the knee.(2) However, a previous evidence synthesis of epidemiological studies observed a gradual decline in the incidence of ankle sprains as people move through younger ages into adulthood and the authors' postulated that this trend may relate to motor control development.(23) Our observation of increased sprain/injury codes in males may reflect trends of higher physical activity levels among young males compared with young females.(24) Although largely speculative, other explanations for the high foot and ankle related consultation patterns in younger ages may include musculoskeletal growth (for example, calcaneal apophysitis in the heel)(25) or possibly relate to concerns about flatter foot profiles.(26) More broadly, during formative years, contextual factors such as the family structure may influence how young people experience and seek care for musculoskeletal pain.(27)

Strengths and Limitations

There has been little prior evidence of national consultation prevalence and incidence patterns for musculoskeletal pain in children and young people in primary care. CPRD Aurum is a large national primary care database, broadly representative of UK primary care with ~20% national coverage (12), although 99% of general practices are located in England. This large sample size has allowed us to present data by individual ages, genders and pain sites, uncovering previously unseen patterns.

Our definition of incident musculoskeletal pain was informed by consultation with our patient and public advisory group, and so rather than attempting to describe true incident (first ever)

consultations for musculoskeletal pain, we defined a gap of 12 months between consultations for musculoskeletal pain as a new episode.

It is possible we have introduced a selection bias by excluding children and young people who do not have 2 years' prior registration at their general practice. Residential mobility is associated with economic instability and family status,(28) and might impact on healthcare utilisation and record completion. However, it is not possible to explore the impact of these factors within routinely collected primary care data in the UK.

Conclusion

Annual consultation prevalence and incidence rates for musculoskeletal pain in children and young people were stable pre-pandemic, although key differences were observed by age, gender, and pain site being consulted for. Understanding the patterns of musculoskeletal pain in children and young people presenting to primary care is key, due to paucity of information on how to effectively treat and care for this population. Future work will explore consultations for rarer musculoskeletal conditions, short-term management of incident musculoskeletal pain and longer-term prognosis in those consulting for non-traumatic musculoskeletal pain, and costs associated with primary health care.

Acknowledgments

CPRD: This study is based in part on data from the Clinical Practice Research Datalink obtained under licence from the UK Medicines and Healthcare products Regulatory Agency. The data is provided by patients and collected by the NHS as part of their care and support. The interpretation and conclusions contained in this study are those of the authors alone.

The study was approved by the CPRD Independent Scientific Advisory Committee (ref 22_002318).

The approved protocol was made available to reviewers.

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Disclosures

None declared.

Conflict of Interest

None declared.

Data Availability Statement

Data may be obtained from a third party and are not publicly available. The data were obtained from the Clinical Practice Research Datalink. Clinical Practice Research Datalink data governance does not allow us to distribute patient data to other parties. Researchers may apply for data access at

<http://www.CPRD.com/>.

References

1. Kassebaum NJ, Arora M, Barber RM, Brown J, Carter A, Casey DC, et al. Global, regional, and national disability-adjusted life-years (DALYs) for 315 diseases and injuries and healthy life expectancy (HALE), 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015. *The Lancet*. 2016 Oct 8;388(10053):1603–58.
2. Jordan KP, Kadam UT, Hayward R, Porcheret M, Young C, Croft P. Annual consultation prevalence of regional musculoskeletal problems in primary care: An observational study. *BMC Musculoskelet Disord* [Internet]. 2010 [cited 2021 Jul 16];11. Available from: <https://pubmed.ncbi.nlm.nih.gov/20598124/>
3. Gov.uk. Office for Health Improvement & Disparities. 2022 [cited 2023 Apr 20]. Musculoskeletal health: applying All Our Health - GOV.UK. Available from: <https://www.gov.uk/government/publications/musculoskeletal-health-applying-all-our-health/musculoskeletal-health-applying-all-our-health>
4. Andreucci A, Campbell P, Mundy LK, Sawyer SM, Kosola S, Patton GC, et al. Sleep problems increase the risk of musculoskeletal pain in boys but not girls: a prospective cohort study. *Eur J Pediatr*. 2020;179(11):1711–9.
5. Gobina I, Villberg J, Välimaa R, Tynjälä J, Whitehead R, Cosma A, et al. Prevalence of self-reported chronic pain among adolescents: Evidence from 42 countries and regions. *European Journal of Pain (United Kingdom)*. 2019;23(2):316–26.
6. King S, Chambers CT, Hugué A, MacNevin RC, McGrath PJ, Parker L, et al. The epidemiology of chronic pain in children and adolescents revisited: A systematic review. *Pain*. 2011 Dec;152(12):2729–38.
7. Kamper SJ, Henschke N, Hestbaek L, Dunn KM, Williams CM. Musculoskeletal pain in children and adolescents. *Braz J Phys Ther*. 2016 May 1;20(3):275–84.
8. Palermo TM. Pain prevention and management must begin in childhood: the key role of psychological interventions. *Pain*. 2020 Sep 1;161(Suppl):S114–21.
9. Eccleston C, Fisher E, Howard RF, Slater R, Forgeron P, Palermo TM, et al. Delivering transformative action in paediatric pain: a Lancet Child & Adolescent Health Commission. Vol. 5, *The Lancet Child and Adolescent Health*. Elsevier; 2021. p. 47–87.
10. NICE. Overview | Low back pain and sciatica in over 16s: assessment and management | Guidance | NICE. Guidelines. 2019;
11. NICE. Chronic pain (primary and secondary) in over 16s: assessment of all chronic pain and management of chronic primary pain. NICE Guidelines. 2021;(April):NICE guideline [NG193].
12. CPRD. Release Notes: CPRD Aurum May 2022 [Internet]. 2022 [cited 2023 May 15]. Available from: <https://doi.org/10.48329/t89s-kf12>
13. Wolf A, Dedman D, Campbell J, Booth H, Lunn D, Chapman J, et al. Data resource profile: Clinical Practice Research Datalink (CPRD) Aurum. *Int J Epidemiol*. 2019 Dec 1;48(6):1740–1740G.

14. Burton C, Bajpai R, Mason KJ, Bailey J, Jordan KP, Mallen CD, et al. The impact of the COVID-19 pandemic on referrals to musculoskeletal services from primary care and subsequent incidence of inflammatory rheumatic musculoskeletal disease: an observational study. *Rheumatol Adv Pract*. 2023;7(2):rkad044.
15. Welsh V, Mason K, Bailey J, Bajpai R, Jordan K, Mallen CD, et al. Trends in musculoskeletal consultations and prescribing: an electronic primary care records study. *British Journal of General Practice*. 2023 May 23;BJGP.2022.0648.
16. The Scottish Government. Management of chronic pain in children and young people: summary. 3/10/2017 [Internet]. 2018 [cited 2023 Nov 6];60. Available from: <http://www.gov.scot/publications/management-chronic-pain-children-young-people/>
17. Tan A, Strauss VY, Protheroe J, Dunn KM. Epidemiology of paediatric presentations with musculoskeletal problems in primary care. *BMC Musculoskelet Disord*. 2018 Feb 6;19(1).
18. Gunz AC, Canizares M, MacKay C, Badley EM. Magnitude of impact and healthcare use for musculoskeletal disorders in the paediatric: A population-based study. *BMC Musculoskelet Disord* [Internet]. 2012 Jun 12 [cited 2023 Oct 5];13(1):1–7. Available from: <https://bmcmusculoskeletdisord.biomedcentral.com/articles/10.1186/1471-2474-13-98>
19. Bondesson E, Olofsson T, Caverius U, Schelin MEC, Jöud A. Consultation prevalence among children, adolescents and young adults with pain conditions: A description of age- And gender differences. *European Journal of Pain* [Internet]. 2020 Mar 1 [cited 2023 Oct 5];24(3):649–58. Available from: <https://portal.research.lu.se/en/publications/consultation-prevalence-among-children-adolescents-and-young-adul>
20. Henschke N, Harrison C, McKay D, Broderick C, Latimer J, Britt H, et al. Musculoskeletal conditions in children and adolescents managed in Australian primary care. *BMC Musculoskelet Disord* [Internet]. 2014 May 20 [cited 2023 Oct 5];15(1). Available from: <https://pubmed.ncbi.nlm.nih.gov/24885231/>
21. Wu A, March L, Zheng X, Huang J, Wang X, Zhao J, et al. Global low back pain prevalence and years lived with disability from 1990 to 2017: estimates from the Global Burden of Disease Study 2017. *Ann Transl Med* [Internet]. 2020 Mar [cited 2023 Nov 6];8(6):299–299. Available from: </pmc/articles/PMC7186678/>
22. Scott IC, Whittle R, Bailey J, Twohig H, Hider SL, Mallen CD, et al. Rheumatoid arthritis, psoriatic arthritis, and axial spondyloarthritis epidemiology in England from 2004 to 2020: An observational study using primary care electronic health record data. *The Lancet regional health Europe*. 2022 Dec;23:100519.
23. Doherty C, Delahunt E, Caulfield B, Hertel J, Ryan J, Bleakley C. The incidence and prevalence of ankle sprain injury: a systematic review and meta-analysis of prospective epidemiological studies. *Sports Med* [Internet]. 2014 Jan 1 [cited 2023 Nov 6];44(1):123–40. Available from: <https://pubmed.ncbi.nlm.nih.gov/24105612/>
24. Guthold R, Stevens GA, Riley LM, Bull FC. Global trends in insufficient physical activity among adolescents: a pooled analysis of 298 population-based surveys with 1.6 million participants. *Lancet Child Adolesc Health* [Internet]. 2020 Jan 1 [cited 2023 Nov 6];4(1):23–35. Available from: <https://pubmed.ncbi.nlm.nih.gov/31761562/>

25. Wiegerinck JI, Yntema C, Brouwer HJ, Struijs PAA. Incidence of calcaneal apophysitis in the general population. *Eur J Pediatr* [Internet]. 2014 [cited 2023 Nov 6];173(5):677–9. Available from: <https://pubmed.ncbi.nlm.nih.gov/24297670/>
26. Rome K, Ashford RL, Evans A. Non-surgical interventions for paediatric pes planus. *Cochrane Database Syst Rev* [Internet]. 2010 Jul 7 [cited 2023 Nov 6];(7). Available from: <https://pubmed.ncbi.nlm.nih.gov/20614443/>
27. Heikkala E, Oura P, Karppinen J, Herbert A, Varis H, Hagnäs M, et al. Family structure and multisite musculoskeletal pain in adolescence: a Northern Finland Birth Cohort 1986 study. *BMC Musculoskelet Disord* [Internet]. 2023 Dec 1 [cited 2023 Nov 6];24(1). Available from: <https://pubmed.ncbi.nlm.nih.gov/36906532/>
28. Verropoulou G, Joshi H, Wiggins RD. Migration, family structure and children's well-being: a multi-level analysis of the second generation of the 1958 Birth Cohort Study. *Child Soc* [Internet]. 2002 Sep 1 [cited 2023 Oct 5];16(4):219–31. Available from: <https://onlinelibrary.wiley.com/doi/full/10.1002/chi.700>

Supplementary Materials

Fig. S1 - Annual Incidence of pain sites by age and gender per 10,000 registered population

Table S1a - Annual Prevalence of MSK consultations per 10,000 registered population by age and site

Table S1b - Annual Prevalence of MSK consultations per 10,000 registered population by age and site in females

Table S1c - Annual Prevalence of MSK consultations per 10,000 registered population by age and site in males

Table S2a - Annual Incidence of MSK consultations per 10,000 registered population by age and site

Table S2b - Annual Incidence of MSK consultations per 10,000 registered population by age and site in females

Table S2c - Annual Incidence of MSK consultations per 10,000 registered population by age and site in males

Table S3a - Top 5 codes for Back, Knee, Foot/Ankle, Hand/Wrist and Chest/Trunk by age in Females

Table S3b - Top 5 codes for Back, Knee, Foot/Ankle, Hand/Wrist and Chest/Trunk by age in Males

Fig. S1 - Annual Incidence of pain sites by age and gender per 10,000 registered population

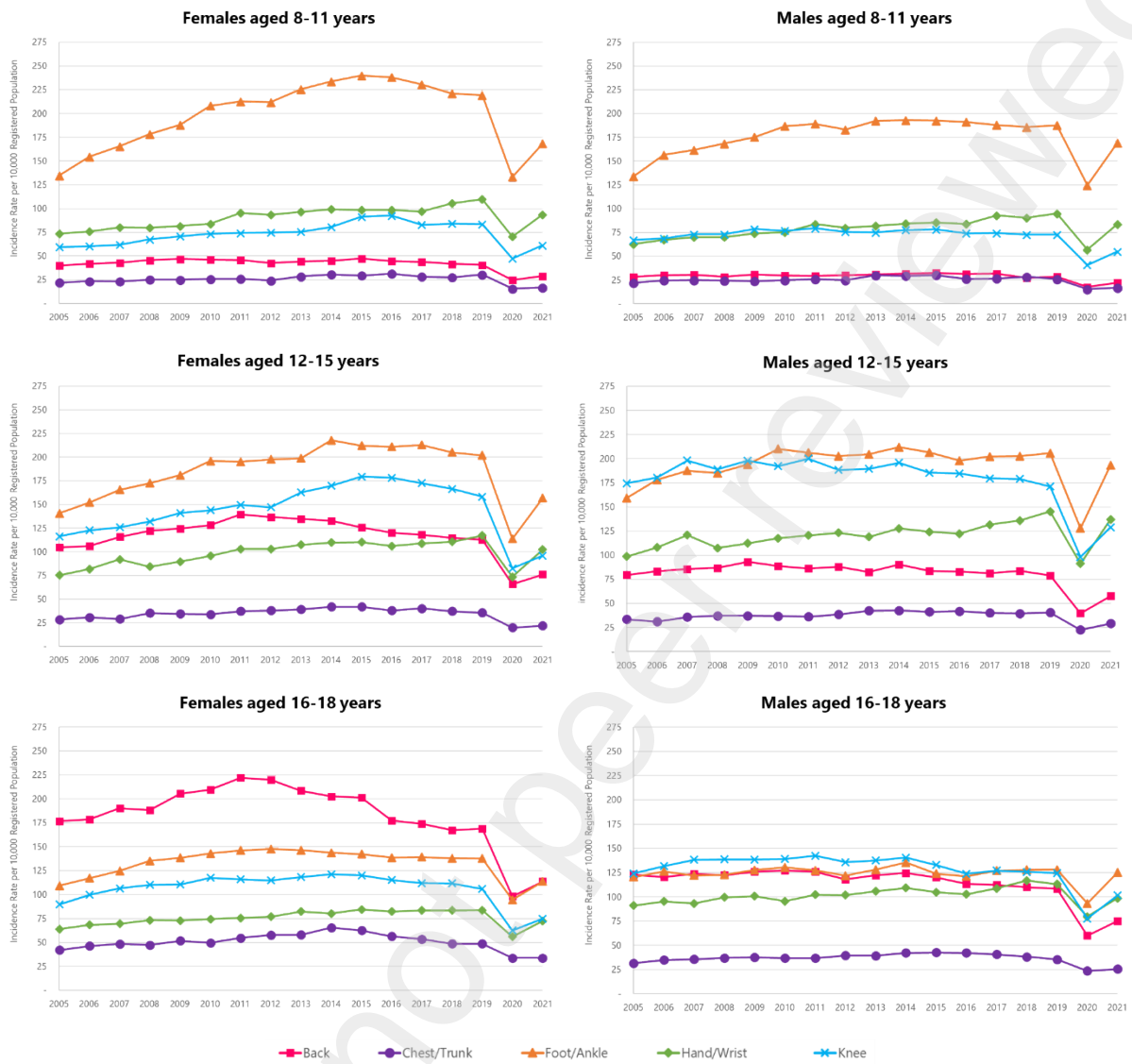


Table S1a - Annual Prevalence of MSK consultations per 10,000 registered population by age and site

Year	Total	Age Bands			Pain Sites				
		8-11 years	12-15 years	16-18 years	Back	Chest/Trunk	Foot/Ankle	Hand/Wrist	Knee
2005	808 (803, 813)	569 (562, 577)	928 (919, 938)	957 (946, 968)	124 (122, 126)	41 (39, 42)	182 (180, 185)	109 (107, 111)	151 (149, 154)
2006	843 (838, 849)	604 (596, 612)	960 (950, 969)	997 (986, 1008)	125 (123, 127)	43 (41, 44)	200 (197, 202)	115 (113, 117)	158 (156, 161)
2007	888 (883, 894)	632 (624, 640)	1035 (1025, 1044)	1026 (1015, 1037)	132 (130, 134)	45 (43, 46)	211 (208, 214)	123 (121, 125)	168 (165, 170)
2008	900 (894, 905)	648 (640, 656)	1038 (1028, 1048)	1045 (1033, 1056)	134 (132, 136)	47 (45, 48)	219 (216, 222)	121 (119, 124)	170 (167, 172)
2009	936 (930, 941)	682 (674, 690)	1081 (1071, 1091)	1081 (1070, 1093)	140 (138, 142)	47 (46, 48)	229 (226, 231)	125 (123, 127)	175 (173, 178)
2010	960 (955, 966)	706 (698, 714)	1119 (1109, 1129)	1096 (1085, 1108)	140 (138, 142)	48 (46, 49)	246 (243, 248)	128 (126, 130)	178 (176, 181)
2011	980 (974, 986)	732 (724, 740)	1146 (1136, 1156)	1110 (1098, 1121)	142 (140, 144)	49 (48, 50)	248 (246, 251)	138 (136, 140)	182 (179, 184)
2012	974 (968, 979)	725 (718, 733)	1148 (1138, 1158)	1106 (1095, 1118)	140 (138, 142)	51 (49, 52)	245 (242, 248)	138 (136, 140)	177 (174, 179)
2013	977 (971, 982)	742 (734, 749)	1147 (1137, 1157)	1103 (1092, 1115)	138 (136, 140)	53 (52, 54)	251 (248, 254)	140 (138, 142)	178 (176, 180)
2014	996 (991, 1002)	765 (757, 772)	1183 (1173, 1193)	1107 (1095, 1118)	135 (133, 137)	56 (54, 57)	262 (259, 265)	145 (143, 147)	185 (182, 187)
2015	993 (987, 998)	779 (772, 787)	1168 (1158, 1178)	1089 (1078, 1100)	133 (131, 135)	55 (54, 57)	261 (258, 263)	143 (141, 145)	185 (183, 188)
2016	964 (959, 970)	770 (762, 777)	1136 (1126, 1145)	1032 (1021, 1043)	125 (123, 127)	52 (51, 54)	254 (251, 256)	141 (139, 143)	181 (179, 184)
2017	955 (950, 960)	755 (747, 762)	1134 (1125, 1144)	1013 (1003, 1024)	121 (119, 123)	51 (49, 52)	253 (250, 256)	147 (145, 149)	177 (174, 179)
2018	941 (936, 946)	741 (734, 748)	1115 (1106, 1124)	1003 (993, 1014)	119 (118, 121)	49 (48, 50)	249 (246, 251)	149 (147, 151)	174 (172, 176)
2019	931 (926, 936)	735 (728, 742)	1104 (1095, 1113)	982 (972, 992)	118 (117, 120)	48 (47, 50)	248 (245, 250)	155 (153, 157)	169 (167, 171)
2020	580 (576, 584)	456 (451, 462)	656 (649, 663)	656 (648, 664)	69 (68, 70)	29 (28, 29)	155 (153, 157)	97 (95, 98)	98 (96, 100)
2021	678 (674, 682)	548 (542, 554)	780 (773, 787)	719 (710, 727)	78 (77, 80)	30 (29, 31)	195 (193, 197)	125 (123, 127)	112 (110, 114)

Table S1b - Annual Prevalence of MSK consultations per 10,000 registered population by age and site in females

Year	Females	Age Bands			Pain Sites				
		8-11 years	12-15 years	16-18 years	Back	Chest/Trunk	Foot/Ankle	Hand/Wrist	Knee
2005	789 (782, 797)	574 (563, 585)	864 (850, 877)	975 (958, 991)	145 (142, 149)	41 (40, 43)	175 (172, 179)	100 (97, 103)	128 (125, 132)
2006	823 (816, 831)	605 (594, 616)	891 (877, 904)	1020 (1003, 1037)	146 (143, 150)	45 (44, 47)	190 (186, 194)	106 (103, 108)	135 (132, 138)
2007	869 (861, 877)	639 (627, 650)	953 (939, 967)	1059 (1042, 1076)	156 (153, 160)	46 (44, 47)	205 (201, 209)	113 (110, 116)	140 (137, 143)
2008	903 (895, 911)	666 (654, 677)	989 (975, 1004)	1102 (1085, 1120)	162 (159, 166)	49 (47, 51)	221 (217, 225)	114 (112, 117)	147 (144, 151)
2009	942 (934, 950)	702 (690, 713)	1033 (1019, 1048)	1148 (1130, 1165)	170 (166, 173)	50 (48, 52)	232 (227, 236)	116 (113, 119)	153 (150, 157)
2010	977 (968, 985)	733 (721, 745)	1087 (1072, 1101)	1175 (1157, 1192)	171 (167, 174)	51 (49, 53)	251 (247, 255)	122 (119, 125)	160 (157, 164)
2011	1010 (1002, 1019)	766 (754, 777)	1133 (1118, 1148)	1208 (1190, 1226)	178 (175, 182)	53 (51, 55)	257 (253, 261)	133 (130, 136)	163 (160, 167)
2012	1014 (1006, 1023)	766 (755, 778)	1146 (1131, 1161)	1223 (1205, 1241)	176 (172, 179)	55 (53, 57)	259 (255, 263)	135 (132, 138)	164 (161, 168)
2013	1025 (1017, 1034)	788 (777, 800)	1169 (1154, 1184)	1212 (1194, 1230)	173 (170, 176)	56 (54, 58)	266 (261, 270)	140 (137, 143)	169 (166, 173)
2014	1048 (1040, 1056)	817 (806, 829)	1209 (1194, 1224)	1211 (1193, 1229)	166 (163, 169)	60 (59, 62)	281 (277, 285)	144 (141, 147)	178 (174, 181)
2015	1056 (1048, 1064)	842 (831, 853)	1206 (1191, 1220)	1204 (1186, 1221)	164 (161, 168)	60 (58, 62)	282 (278, 287)	143 (140, 146)	188 (185, 192)
2016	1027 (1019, 1034)	836 (825, 847)	1172 (1158, 1186)	1134 (1117, 1151)	151 (148, 154)	57 (55, 59)	276 (272, 280)	141 (138, 143)	187 (184, 191)
2017	1003 (995, 1010)	805 (795, 816)	1166 (1153, 1179)	1086 (1070, 1102)	146 (143, 149)	54 (52, 56)	273 (269, 277)	142 (140, 145)	179 (176, 182)
2018	980 (973, 987)	793 (782, 803)	1130 (1117, 1143)	1059 (1043, 1074)	144 (142, 147)	52 (50, 53)	264 (260, 268)	147 (144, 149)	175 (172, 179)
2019	963 (956, 971)	786 (775, 796)	1104 (1091, 1116)	1035 (1020, 1050)	142 (140, 145)	52 (51, 54)	260 (256, 264)	150 (147, 153)	169 (166, 171)
2020	599 (593, 605)	481 (473, 490)	658 (648, 668)	690 (678, 702)	87 (85, 89)	30 (29, 32)	157 (154, 160)	94 (92, 97)	95 (93, 98)
2021	666 (661, 672)	561 (552, 569)	730 (720, 740)	728 (716, 741)	94 (91, 96)	30 (29, 31)	186 (183, 189)	116 (114, 119)	102 (100, 105)

Table S1c - Annual Prevalence of MSK consultations per 10,000 registered population by age and site in males

Year	Males	Age Bands			Pain Sites				
		8-11 years	12-15 years	16-18 years	Back	Chest/Trunk	Foot/Ankle	Hand/Wrist	Knee
2005	824 (817, 831)	565 (555, 576)	983 (970, 996)	942 (927, 956)	105 (103, 108)	40 (38, 42)	188 (185, 192)	116 (113, 119)	171 (168, 174)
2006	860 (853, 868)	603 (593, 614)	1018 (1005, 1032)	977 (962, 992)	107 (104, 109)	40 (38, 42)	208 (204, 212)	123 (120, 126)	178 (175, 182)
2007	905 (897, 912)	627 (616, 637)	1104 (1090, 1118)	998 (983, 1013)	111 (108, 113)	44 (42, 46)	216 (212, 220)	132 (129, 135)	192 (188, 195)
2008	897 (890, 905)	633 (622, 643)	1080 (1066, 1093)	997 (982, 1012)	110 (107, 112)	45 (43, 46)	217 (213, 221)	127 (125, 130)	189 (185, 192)
2009	931 (923, 938)	664 (654, 675)	1122 (1108, 1136)	1026 (1011, 1041)	114 (112, 117)	45 (43, 46)	226 (222, 230)	132 (129, 135)	194 (190, 197)
2010	946 (938, 954)	682 (671, 692)	1147 (1133, 1161)	1031 (1016, 1047)	113 (110, 116)	45 (43, 47)	241 (237, 245)	134 (131, 137)	194 (191, 198)
2011	954 (946, 961)	702 (691, 713)	1157 (1143, 1171)	1027 (1012, 1043)	110 (107, 113)	46 (44, 47)	241 (237, 245)	142 (139, 145)	198 (194, 201)
2012	938 (930, 945)	687 (676, 697)	1150 (1136, 1164)	1008 (993, 1023)	108 (106, 111)	47 (45, 49)	233 (230, 237)	141 (138, 144)	188 (184, 191)
2013	933 (925, 940)	698 (687, 708)	1128 (1114, 1142)	1011 (996, 1026)	106 (104, 109)	50 (49, 52)	238 (234, 241)	141 (138, 144)	186 (182, 189)
2014	950 (942, 957)	714 (704, 724)	1160 (1146, 1174)	1019 (1004, 1035)	108 (105, 110)	51 (49, 53)	245 (241, 248)	146 (143, 149)	191 (188, 195)
2015	935 (928, 942)	720 (709, 730)	1133 (1120, 1146)	992 (977, 1007)	105 (103, 108)	51 (50, 53)	241 (237, 244)	143 (140, 146)	182 (179, 186)
2016	907 (900, 914)	707 (697, 716)	1102 (1089, 1115)	944 (930, 958)	100 (98, 102)	48 (46, 50)	233 (230, 237)	142 (139, 144)	176 (173, 179)
2017	910 (903, 917)	706 (697, 716)	1104 (1092, 1117)	950 (936, 964)	98 (96, 100)	47 (46, 49)	234 (231, 238)	151 (148, 153)	175 (172, 178)
2018	904 (898, 911)	691 (682, 701)	1100 (1088, 1112)	953 (939, 967)	96 (94, 98)	47 (45, 48)	234 (231, 238)	152 (149, 155)	172 (169, 175)
2019	901 (894, 908)	686 (677, 696)	1105 (1092, 1117)	934 (920, 947)	95 (93, 98)	45 (43, 46)	236 (233, 240)	159 (156, 162)	169 (166, 172)
2020	563 (557, 568)	433 (425, 440)	654 (645, 664)	624 (613, 635)	52 (51, 54)	27 (26, 28)	154 (151, 157)	99 (97, 102)	101 (98, 103)
2021	689 (683, 695)	537 (528, 545)	828 (817, 838)	709 (698, 721)	64 (62, 66)	30 (29, 31)	204 (201, 207)	133 (130, 136)	121 (119, 123)

Table S2a - Annual Incidence of MSK consultations per 10,000 registered population by age and site

Year	Total	Age Bands			Pain Sites				
		8-11 years	12-15 years	16-18 years	Back	Chest/Trunk	Foot/Ankle	Hand/Wrist	Knee
2005	699 (694, 704)	523 (516, 530)	794 (785, 802)	800 (790, 810)	95 (93, 97)	32 (31, 33)	146 (144, 148)	85 (83, 87)	117 (115, 119)
2006	726 (721, 731)	554 (546, 561)	819 (810, 827)	825 (814, 835)	95 (93, 97)	33 (32, 34)	160 (158, 162)	89 (88, 91)	120 (118, 122)
2007	760 (755, 765)	577 (569, 584)	875 (866, 884)	846 (835, 856)	100 (98, 101)	34 (33, 35)	168 (165, 170)	95 (93, 97)	128 (126, 130)
2008	767 (762, 772)	591 (584, 599)	869 (860, 878)	861 (851, 871)	101 (99, 103)	36 (35, 37)	174 (171, 176)	92 (91, 94)	129 (126, 131)
2009	800 (794, 805)	621 (614, 629)	910 (901, 919)	891 (880, 901)	105 (103, 107)	36 (35, 37)	182 (179, 184)	95 (93, 97)	133 (131, 135)
2010	816 (811, 821)	641 (633, 648)	937 (928, 947)	896 (885, 906)	105 (103, 107)	36 (35, 37)	195 (193, 198)	97 (96, 99)	133 (131, 135)
2011	832 (827, 837)	660 (653, 668)	958 (948, 967)	907 (897, 918)	107 (105, 109)	37 (36, 38)	196 (194, 199)	105 (103, 107)	138 (135, 140)
2012	823 (817, 828)	655 (647, 662)	952 (942, 961)	897 (887, 908)	104 (102, 106)	38 (37, 39)	194 (192, 197)	104 (102, 106)	132 (130, 134)
2013	829 (824, 835)	672 (665, 680)	956 (947, 965)	898 (887, 908)	102 (100, 103)	41 (39, 42)	200 (197, 202)	107 (105, 108)	135 (133, 137)
2014	849 (844, 854)	693 (685, 700)	989 (980, 998)	904 (893, 914)	101 (99, 103)	43 (42, 44)	208 (205, 210)	110 (108, 112)	139 (137, 141)
2015	846 (841, 851)	705 (698, 712)	976 (967, 985)	888 (878, 898)	99 (97, 101)	42 (41, 43)	207 (204, 209)	109 (108, 111)	140 (138, 142)
2016	822 (817, 827)	695 (688, 702)	948 (940, 957)	843 (834, 853)	93 (91, 94)	40 (39, 41)	203 (200, 205)	108 (106, 109)	137 (135, 139)
2017	818 (813, 823)	680 (673, 687)	954 (945, 962)	841 (831, 851)	91 (90, 93)	39 (38, 40)	202 (200, 205)	113 (111, 115)	134 (132, 136)
2018	806 (801, 810)	670 (664, 677)	936 (928, 944)	827 (818, 837)	90 (88, 91)	38 (37, 39)	199 (197, 201)	116 (114, 118)	132 (130, 134)
2019	796 (792, 801)	665 (658, 671)	925 (917, 933)	810 (801, 819)	88 (87, 90)	37 (36, 38)	198 (196, 201)	120 (119, 122)	128 (126, 130)
2020	486 (482, 489)	407 (402, 413)	537 (531, 543)	529 (522, 536)	51 (50, 52)	23 (22, 23)	126 (124, 128)	77 (76, 78)	73 (72, 75)
2021	606 (602, 610)	508 (502, 513)	693 (686, 700)	623 (616, 631)	62 (60, 63)	25 (24, 25)	166 (164, 168)	105 (103, 106)	91 (89, 92)

Table S2b - Annual Incidence of MSK consultations per 10,000 registered population by age and site in females

Year	Females	Age Bands			Pain Sites				
		8-11 years	12-15 years	16-18 years	Back	Chest/Trunk	Foot/Ankle	Hand/Wrist	Knee
2005	678 (671, 685)	523 (512, 533)	736 (723, 748)	807 (792, 822)	101 (98, 104)	30 (28, 31)	130 (127, 133)	71 (69, 74)	89 (86, 91)
2006	704 (697, 712)	552 (541, 562)	753 (741, 766)	838 (823, 854)	103 (100, 106)	32 (31, 34)	143 (140, 146)	76 (73, 78)	94 (91, 97)
2007	743 (736, 751)	583 (572, 594)	801 (789, 814)	878 (862, 893)	110 (107, 113)	32 (31, 34)	154 (151, 158)	81 (79, 84)	97 (95, 100)
2008	767 (759, 774)	605 (594, 616)	826 (813, 839)	903 (887, 919)	113 (110, 115)	35 (33, 36)	164 (161, 168)	79 (77, 82)	102 (100, 105)
2009	801 (794, 809)	635 (624, 647)	867 (853, 880)	941 (925, 957)	118 (115, 121)	36 (34, 37)	172 (168, 175)	82 (79, 84)	107 (104, 109)
2010	827 (819, 835)	662 (651, 673)	906 (893, 920)	954 (938, 970)	119 (116, 122)	35 (33, 37)	186 (183, 190)	85 (83, 88)	110 (107, 113)
2011	851 (843, 859)	686 (675, 697)	941 (928, 955)	973 (957, 990)	125 (122, 127)	37 (36, 39)	189 (185, 193)	93 (90, 95)	112 (109, 114)
2012	850 (843, 858)	687 (676, 697)	941 (927, 954)	983 (966, 999)	120 (117, 123)	38 (36, 39)	190 (187, 194)	92 (90, 95)	110 (107, 113)
2013	863 (855, 870)	708 (697, 719)	965 (952, 979)	973 (957, 989)	116 (114, 119)	40 (38, 41)	196 (193, 200)	97 (94, 99)	116 (114, 119)
2014	882 (874, 889)	733 (723, 744)	995 (981, 1008)	973 (956, 989)	113 (110, 116)	43 (41, 45)	206 (203, 210)	98 (96, 101)	121 (118, 124)
2015	892 (885, 899)	756 (745, 767)	997 (984, 1010)	972 (956, 988)	111 (109, 114)	42 (40, 43)	207 (203, 211)	99 (97, 102)	129 (126, 132)
2016	864 (857, 871)	748 (737, 758)	963 (951, 976)	912 (897, 927)	103 (100, 105)	40 (38, 41)	205 (202, 209)	97 (95, 100)	129 (126, 131)
2017	849 (842, 856)	719 (709, 729)	965 (953, 978)	890 (875, 904)	101 (99, 104)	39 (37, 40)	203 (199, 206)	98 (96, 100)	122 (120, 125)
2018	827 (820, 833)	712 (702, 721)	932 (920, 943)	855 (841, 869)	98 (96, 101)	36 (35, 37)	195 (192, 199)	102 (100, 104)	121 (119, 124)
2019	814 (807, 821)	703 (693, 713)	913 (901, 924)	841 (828, 855)	98 (96, 101)	37 (35, 38)	193 (190, 196)	106 (104, 108)	116 (114, 119)
2020	493 (488, 499)	424 (416, 432)	526 (517, 535)	551 (540, 562)	58 (57, 60)	22 (21, 23)	116 (114, 119)	68 (66, 70)	64 (62, 66)
2021	589 (584, 595)	517 (509, 526)	639 (630, 649)	622 (611, 633)	68 (66, 70)	23 (22, 24)	150 (147, 152)	91 (89, 93)	77 (75, 79)

Table S2c - Annual Incidence of MSK consultations per 10,000 registered population by age and site in males

Year	Males	Age Bands			Pain Sites				
		8-11 years	12-15 years	16-18 years	Back	Chest/Trunk	Foot/Ankle	Hand/Wrist	Knee
2005	716 (709, 723)	523 (513, 533)	843 (831, 855)	794 (780, 807)	73 (71, 76)	29 (28, 30)	139 (136, 142)	84 (81, 86)	123 (120, 125)
2006	744 (738, 751)	556 (546, 566)	874 (861, 886)	813 (799, 827)	75 (73, 77)	30 (28, 31)	156 (153, 159)	90 (88, 92)	127 (124, 130)
2007	774 (767, 781)	572 (562, 582)	938 (925, 951)	819 (805, 832)	77 (75, 79)	32 (30, 33)	160 (157, 163)	95 (92, 97)	137 (134, 140)
2008	767 (760, 774)	579 (569, 589)	906 (893, 918)	827 (813, 840)	76 (74, 78)	33 (31, 34)	161 (158, 165)	92 (89, 94)	133 (131, 136)
2009	798 (791, 805)	608 (598, 619)	947 (935, 960)	849 (835, 863)	80 (78, 82)	32 (31, 34)	168 (165, 172)	95 (93, 97)	138 (135, 141)
2010	807 (800, 814)	621 (611, 631)	964 (951, 976)	847 (833, 860)	78 (76, 80)	32 (31, 34)	179 (176, 183)	96 (93, 98)	135 (133, 138)
2011	815 (808, 822)	636 (626, 646)	972 (959, 985)	852 (838, 866)	76 (74, 78)	33 (31, 34)	178 (175, 182)	102 (99, 104)	140 (137, 143)
2012	798 (791, 805)	625 (615, 635)	961 (948, 973)	826 (812, 839)	74 (72, 76)	34 (32, 35)	174 (170, 177)	101 (99, 104)	132 (129, 135)
2013	800 (793, 806)	639 (629, 648)	948 (935, 960)	835 (821, 848)	73 (71, 75)	37 (35, 38)	180 (176, 183)	101 (99, 104)	132 (129, 135)
2014	819 (812, 826)	653 (644, 663)	984 (971, 997)	846 (832, 860)	76 (74, 78)	37 (36, 39)	185 (181, 188)	106 (103, 108)	135 (132, 138)
2015	803 (796, 810)	656 (646, 665)	957 (945, 969)	817 (804, 831)	73 (71, 75)	37 (36, 39)	180 (177, 183)	104 (102, 106)	130 (127, 133)
2016	783 (777, 790)	645 (636, 654)	934 (922, 946)	785 (772, 798)	70 (68, 72)	36 (34, 37)	176 (173, 179)	102 (100, 104)	126 (123, 129)
2017	789 (783, 796)	643 (634, 652)	942 (931, 954)	799 (786, 812)	70 (68, 71)	35 (34, 36)	178 (175, 181)	111 (108, 113)	125 (123, 128)
2018	786 (779, 792)	631 (622, 640)	940 (929, 952)	803 (790, 815)	68 (66, 70)	35 (34, 36)	178 (175, 181)	113 (111, 116)	124 (122, 127)
2019	779 (773, 786)	628 (619, 637)	937 (926, 949)	781 (769, 794)	67 (65, 69)	34 (32, 35)	179 (176, 182)	118 (115, 120)	122 (119, 124)
2020	479 (474, 484)	391 (384, 399)	548 (539, 557)	509 (499, 519)	36 (35, 38)	20 (19, 21)	118 (115, 120)	75 (73, 77)	71 (69, 73)
2021	622 (616, 627)	499 (490, 507)	744 (734, 754)	625 (614, 636)	49 (47, 50)	24 (23, 25)	166 (164, 169)	107 (105, 109)	94 (92, 96)

Table S3a - Top 5 codes for Back, Knee, Foot/Ankle, Hand/Wrist and Chest/Trunk by age in females

Body Site	Aged 8-11 years		Aged 12-15 years		Aged 16-18 years	
Back	25%	Low back pain	31%	Low back pain	37%	Low back pain
	18%	Back pain	12%	Back pain	11%	Back pain
	5%	C/O - low back pain	6%	C/O - low back pain	8%	C/O - low back pain
	3%	Acute thoracic back pain	4%	Coccygodynia	2%	Mechanical low back pain
	2%	Coccygodynia	3%	Idiopathic scoliosis	1%	Coccygodynia
Chest/Trunk	46%	Musculoskeletal chest pain	36%	Musculoskeletal chest pain	36%	Musculoskeletal chest pain
	16%	Costochondritis	22%	Costochondritis	23%	Costochondritis
	11%	Rib pain	15%	Rib pain	14%	Rib pain
	9%	Chest wall pain	8%	Chest wall pain	7%	Chest wall pain
	4%	Anterior chest wall pain	3%	Anterior chest wall pain	3%	Anterior chest wall pain
Foot/Ankle	16%	Foot pain	14%	Ankle sprain	15%	Foot pain
	11%	Ankle sprain	14%	Foot pain	14%	Ankle sprain
	11%	Ankle pain	10%	Ankle pain	9%	Ankle pain
	7%	Foot injury	8%	Ankle injury	7%	Ankle injury
	6%	Ankle injury	6%	Foot injury	6%	Foot injury
Hand/Wrist	12%	Wrist injury	10%	Finger injury	11%	Wrist joint pain
	10%	Finger injury	8%	Wrist injury	9%	Ganglion of wrist
	6%	Wrist sprain NOS	8%	Wrist joint pain	6%	Hand pain
	6%	Injury of hand	7%	Injury of hand	6%	Wrist injury
	5%	Wrist joint pain	4%	Wrist sprain NOS	5%	Finger injury
Knee	52%	Knee pain	52%	Knee pain	54%	Knee pain
	11%	Knee injury	8%	Juvenile osteochondrosis of tibial tubercle	8%	Knee injury
	9%	Juvenile osteochondrosis of tibial tubercle	7%	Anterior knee pain	7%	Anterior knee pain
	5%	Anterior knee pain	7%	Knee injury	4%	Chondromalacia patellae
	2%	Knee sprain	4%	Chondromalacia patellae	2%	Knee sprain

Table S3b - Top 5 codes for Back, Knee, Foot/Ankle, Hand/Wrist and Chest/Trunk by age in males

Body Site		Aged 8-11 years		Aged 12-15 years		Aged 16-18 years
Back	25%	Low back pain	32%	Low back pain	36%	Low back pain
	19%	Back pain	14%	Back pain	11%	Back pain
	5%	C/O - low back pain	6%	C/O - low back pain	8%	C/O - low back pain
	4%	Traumatic and/or non-traumatic injury of back	3%	Acute thoracic back pain	2%	Acute thoracic back pain
	3%	Acute thoracic back pain	2%	Coccygodynia	2%	Mechanical low back pain
Chest/Trunk	48%	Musculoskeletal chest pain	40%	Musculoskeletal chest pain	43%	Musculoskeletal chest pain
	12%	Costochondritis	14%	Rib pain	14%	Costochondritis
	12%	Rib pain	12%	Costochondritis	13%	Rib pain
	9%	Chest wall pain	8%	Chest wall pain	7%	Chest wall pain
	4%	Anterior chest wall pain	3%	Symptom: chest wall	3%	C/O - a chest wall symptom
Foot/Ankle	13%	Foot pain	12%	Foot pain	19%	Ankle sprain
	10%	Heel pain	11%	Ankle sprain	12%	Ankle injury
	10%	Ankle sprain	8%	Ankle pain	10%	Foot pain
	8%	Ankle pain	8%	Ankle injury	9%	Ankle pain
	7%	Foot injury	8%	Foot injury	8%	Foot injury
Hand/Wrist	13%	Finger injury	10%	Finger injury	13%	Injury of hand
	10%	Wrist injury	10%	Injury of hand	7%	Wrist joint pain
	8%	Thumb injury	10%	Wrist injury	7%	Finger injury
	7%	Injury of hand	7%	Thumb injury	7%	Wrist injury
	4%	Wrist sprain NOS	4%	Wrist sprain NOS	5%	Hand pain
Knee	52%	Knee pain	42%	Knee pain	47%	Knee pain
	16%	Knee injury	21%	Juvenile osteochondrosis of tibial tubercle	14%	Knee injury
	7%	Juvenile osteochondrosis of tibial tubercle	11%	Knee injury	5%	Juvenile osteochondrosis of tibial tubercle
	4%	Anterior knee pain	4%	Anterior knee pain	4%	Anterior knee pain
	3%	Knee sprain	2%	Knee sprain	3%	Knee sprain