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# General practice consultations and use of prescription drugs after changes to school absence policy

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## ORIGINAL ARTICLE

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## **BACKGROUND**

New rules for absence with stricter requirements for documentation were introduced in upper secondary schools in the autumn of 2016. We investigated the use of general practice services and dispensing of prescription drugs among 16 – 18-year-olds in the autumn of 2016 and compared this with equivalent figures for the period 2013 – 15.

## **MATERIAL AND METHOD**

We retrieved information on consultations in general practice (GP) and dispensing of prescription drugs to 15 – 18-year-olds in the period 2013 – 16 from the Directorate of Health's system for control and payment of health reimbursements (KUHR) and the Norwegian Prescription Database respectively. The number of consultations and dispensing of drugs were compared to previous years using Poisson regression (reference year 2015). The incidence rate ratio (IRR) was used as an outcome measure.

## **RESULTS**

The number of GP consultations for 16 – 18-year-olds was 30 % higher in the autumn of 2016 than in the autumn of 2015 (IRR 1.30, 95 % confidence interval (CI) 1.29 – 1.31). In the same period, the dispensing of drugs to this age group increased by 8 % (IRR 1.08, 95 % CI 1.08 – 1.09). Among the diagnosis groups, respiratory tract infections had the largest increase (IRR 2.21, 95 % CI 2.17 – 2.25). The largest increase in drug dispensing was found for remedies for coughs and colds (IRR 1.73, 95 % CI 1.65 – 1.80).

## **INTERPRETATION**

The increase in consultations in general practice and dispensing of drugs to 16 – 18-year-olds coincided in time with the introduction of new rules for absence from school. We hold it to be highly likely that the changes were caused by the stricter rules for documentation of absence from school.

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## **Main message**

In the autumn of 2016, the first semester after the introduction of new rules for absence in upper secondary schools, there were 30 % more consultations in general practice among 16 – 18-year-olds when compared to the autumn of 2015.

In the same period and in the same age group, the dispensing of prescription drugs increased by 8 %, the largest increase being in the dispensing of cough medicine and antibiotics.

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In Norway, everybody who has completed primary and lower secondary school has a statutory right to education at the upper secondary level. Most of those eligible make use of this option, and in 2015 altogether 92.2 % of all young people aged 16 – 18 were enrolled in upper secondary education [\(1\)](#).

From the start of the 2016 – 17 school year, new rules for absence were introduced in upper secondary schools [\(2\)](#). The main feature of the new regulations is that students with more than 10 % undocumented absence from a subject have no right to a graded semester assessment or an overall achievement grade for the subject in question. In case of illness, only 'a medical certificate or documentation issued by another expert' will be considered valid documentation.

Having an overview of health, illness and use of the health services is fundamental for public health promotion. Changes in regulations in areas that are not directly related to health may entail consequences for public health. GPs have reported a rush of students who need documentation of reasons for absence after the introduction of the new rules [\(3\)](#).

We therefore wished to investigate possible changes in the use of GP services and dispensing of prescription drugs to young people during the first semester after the introduction of the new regulations in the autumn of 2016.

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## Material and method

The study is based on data from the Directorate of Health's system for control and payment of health reimbursements (KUHR) and the Norwegian Prescription Database (NorPD) [\(4, 5\)](#). Information from KUHR was based on reimbursement requests from general practice services (GPs and out-of-hours services), while data from NorPD included information on all dispensing of prescription drugs from Norwegian pharmacies to the 15 – 18 age group. The population base as of 1 January for the years 2013 – 16 was retrieved from Statistics Norway's website [\(6\)](#). The data are anonymous, and the study was thus not subject to review by the Regional Committee of Medical and Health Research Ethics.

The data sets (KUHR and NorPD) encompassed the period 2013 – 16 with data for all those who reached the age of 15 – 18 in each of the years in question. Both data sets included information on sex and year of birth. We calculated age by subtracting the birth year from the calendar year. We use the term '16 – 18-year-olds' to refer to those who reached the age of 16, 17 or 18 years respectively in the calendar years in question, irrespective of their exact date of birth. In the Norwegian education system, children start school in the year they turn six, and with a normal progression the 16 – 18-year-olds will in our definition

correspond to young people in upper secondary school in the autumn semester. Data for 15-year-olds (corresponding to year 10 of lower secondary school) were used for purposes of comparison in some of the analyses.

The data set from KUHR included information on consultation dates, diagnosis codes according to the *International Classification of Primary Care 2* (ICPC-2), fee codes and type of practice (out-of-hours service/GP). We included consultations with the fee codes 2ad (consultation with a GP, daytime), 2ak (consultation with a GP, evening) and 2fk (consultation and supplement for call-out to surgery for emergency assistance during out-of-hours periods) (7). We grouped the diagnosis codes in the way described above (8, 9). Table 1 provides an overview of the groupings of the diagnosis codes. Telephone contacts (defined through the fee codes 1bd and 1bk) were analysed separately.

**Table 1**

Distribution of *International Classification of Primary Care 2* (ICPC-2) codes by diagnosis groups used in the analysis of consultations in general practice services (GPs/out-of-hours services) by young people aged 16 – 18 years

Group <sup>1</sup>	ICPC-2 codes
Respiratory tract infections	H71-H74, R05, R09-R23, R71-R83
Headaches	N01, N89, N95
Gastrointestinal ailments	D01-D12, D17-D21, D84-D87, D90, D92, D93
Mental disorders	P01-P99

<sup>1</sup>The grouping is based on the groups used by Statistics Norway (9)

The data set from NorPD contained information on the date of dispensing of drugs and codes for the types of drugs according to the Anatomical Therapeutic Chemical classification system (ATC codes). We analysed all drugs in total and groups of drugs. Table 2 provides an overview of how the drugs were grouped on the basis of ATC codes.

**Table 2**

Grouping of drugs on the basis of Anatomical Therapeutic Chemical classification (ATC codes), used in the analysis of withdrawals of drugs by young people aged 16 – 18 years.

Group	ATC code
Antibiotics commonly used against respiratory tract infections	J01AA02, J01CA04, J01CE02, J01FA01, J01FA09
Remedies for coughs and colds	All R05
Analgetics	All N02
Psycholeptics	All N05
Psychoanaleptics	All N06

Group	ATC code
Contraceptives	All G03A

## Statistical analyses

All analyses were undertaken using the software application package Stata®<sup>14</sup> (Statacorp, Tx, US). We present the number of consultations and the number of drugs dispensed by week graphically. In addition, we used Poisson regression models with the number of consultations each autumn (the weeks 33 – 50, equal to the period from mid-August to mid-December, hereafter referred to as the autumn semester) as the outcome variable, and year and sex as explanatory variables. In the Poisson regression, we took the population number of the sex, age and year groups respectively into account. The results are presented as incidence rate ratios (IRR) with a 95 % confidence interval (CI) with data for 16 – 18-year-olds in 2015 as reference. Thus, the incidence rate ratio provides a measure for the number of events (consultations or dispensing of drugs) in the autumn of 2016 relative to the number of events in the autumn of 2015, adjusted for the population.

## Results

The number of consultations among 16 – 18-year-olds in the autumn semester remained stable through the years 2013 – 15, but rose significantly in 2016 (2013: 135 606; 2014: 141 100; 2015: 139 073; 2016: 181 000). The population basis remained stable throughout this period (Table 3). Table 3 shows that the consultation rate in general practice (GP/out-of-hours services) was 92.3 per 100 persons in the autumn of 2016, compared to 71.2 per 100 in the preceding year, equivalent to an increase of 30 % (IRR 1.30, 95 % CI 1.29 – 1.31). The increase in the number of consultations among 16 – 18-year-olds in the autumn of 2016 was already noticeable in the first week after the start of the school year, with a peak in week 36 (5 – 12 September) (Figure 1a). No similar increase was observed among the 15-year-olds (Figure 1b).

**Table 3**

Number of events (consultations and dispensing of drugs) each autumn semester (weeks 33 – 50) per 100 inhabitants aged 16 – 18. Incidence rate ratio with a 95 % confidence interval, 2016 relative to 2015 (IRR 2016)

	2013	2014	2015	2016	
	(N <sup>1</sup> = 197 141)	(N = 196 055)	(N = 195 198)	(N = 196 165)	IRR 2016
Consultations with GPs and out-of-hours services					
Total	68.8	72.0	71.2	92.3	1.30 (1.29–1.31)

	2013	2014	2015	2016	
	(N <sup>1</sup> = 197 141)	(N = 196 055)	(N = 195 198)	(N = 196 165)	IRR 2016
Respiratory tract infections	9.7	10.4	10.5	23.2	2.21 (2.17–2.25)
Headaches	2.1	2.4	2.4	4.2	1.75 (1.68–1.81)
Gastrointestinal ailments	4.0	4.1	3.8	5.4	1.41 (1.37–1.46)
Mental disorders	7.2	7.7	7.7	9.1	1.19 (1.17–1.22)
Telephone consultations	23.9	25.3	26.4	35.1	1.32 (1.31–1.35)
Drugs dispensed					
<b>Total</b>	100.5	104.2	104.9	113.4	1.08 (1.08–1.09)
Antibiotics commonly used against respiratory tract infections	4.6	4.7	4.9	6.1	1.26 (1.23–1.29)
Remedies for coughs and colds	1.4	1.6	1.6	2.7	1.73 (1.65–1.80)
Analgetics	3.9	4.4	4.3	5.0	1.15 (1.12–1.19)
Psycholeptics	3.2	3.4	3.6	4.6	1.29 (1.25–1.34)
Psychoanaleptics	6.1	6.5	6.8	7.4	1.08 (1.05–1.11)
Contraceptives (girls only)	57.2	58.1	57.9	56.7	0.98 (0.97–0.99)

<sup>1</sup>Number of persons in the population basis

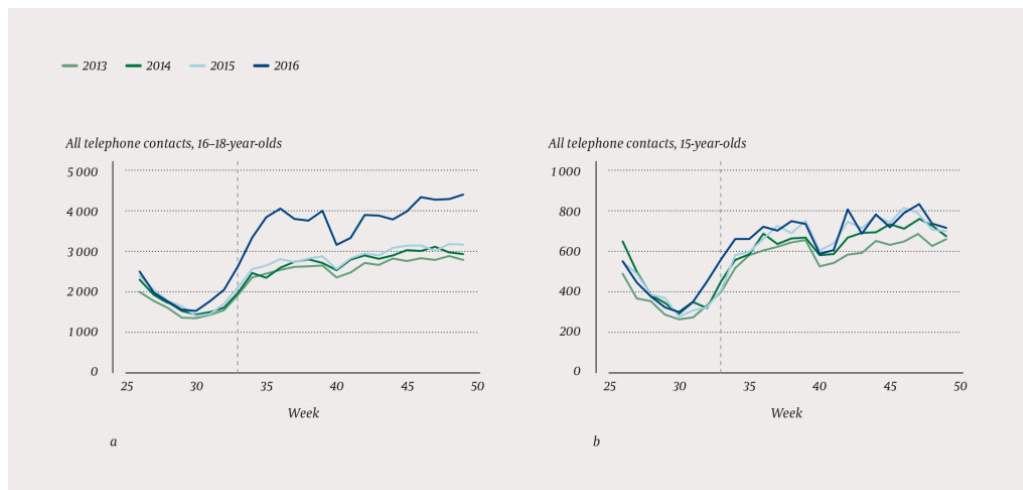


**Figure 1** Number of consultations in general practice per week in the years 2013 – 16 (age group 16 – 18 years unless otherwise specified). a) All consultations. b) All consultations in the age group 15 years. c) Respiratory tract infections. d) Headaches. e) Gastrointestinal ailments. f) Mental disorders. The dotted line marks week 33, generally the week when the school year starts (mid-August).

Respiratory tract infections constituted the most frequently occurring diagnosis group (Table 3, Figure 1c). During the period 2013 – 15, the number of consultations for respiratory tract infections remained consistently below 1 500 per week, while a significant increase was seen in 2016, with 3 492 as the highest number recorded in week 36. The consultation rate for respiratory tract infections was 23.2 per 100 persons in the autumn of 2016, compared to 10.5 per 100 in the preceding year, equal to more than a doubling (IRR 2.21, 95 % CI 2.17 – 2.25), see Table 3.

The number of consultations for headaches, gastrointestinal ailments and mental disorders was also higher in 2016 when compared to previous years (Table 3, Figures 1d–1f)

Moreover, more telephone contacts with 16 – 18-year-olds were registered in the autumn of 2016 when compared to previous years (2013: 47 028; 2014: 49 506; 2015: 51 602; 2016: 68 757), whereas no such change was observed for 15-year-olds (Figure 2). The telephone consultation rates increased from 23.9 per 100 persons in the autumn of 2013 to 26.4 per 100 in the autumn of 2015, with a further rise to 35.1 per 100 in the autumn of 2016 (Table 3, Figure 2). The increase in telephone contacts from the autumn of 2015 to the autumn of 2016 amounted to 32 % (IRR 1.32, 95 % CI 1.31 – 1.35).



**Figure 2** Number of telephone contacts (fee code 1bd or 1bk) per week in the years 2013 – 16. a) All telephone contacts in the age group 16 – 18 years. b) All telephone contact in the age group 15 years.

We also observed an increase in the dispensing of drugs to 16 – 18-year-olds in the autumn of 2016 (Table 3, Figure 3a). Compared to the previous year, 8 % more drugs were dispensed to this age group (Table 3). Among the 15-year-olds the variations in drug use in the years 2013 – 2016 were somewhat greater (Figure 3b), and 2016 is not much different from 2015. The increase for the 16 – 18-year-olds mainly involved antibiotics commonly used against respiratory tract infections (Table 3, Figure 3c) and remedies for coughs and colds (Table 3, Figure 3d).



**Figure 3** Dispensing rate for prescription drugs per week in the years 2013 – 16 (age group 16 – 18 years unless otherwise specified). a) All drugs. b) All drugs in the age group 15 years. c) Antibiotics commonly used against respiratory tract infections. d) Remedies for coughs and colds. e) Analgesics. f) Psycholeptics. f) Psychoanaleptics. h) Contraceptives. The dotted line marks week 33, normally the week when the school year starts (mid-August).

The dispensing rate for drugs in the analgesics group (ATC code N02) was also higher in the autumn of 2016 when compared to previous years (Table 3, Figure 3e), and this also applied to psycholeptics (ATC code N05) (Table 3, Figure 3f). As regards the psychoanaleptics group (ATC code N06), an increase may seem

to have occurred each year through the period 2013 – 16, without any marked difference at the start of the 2016 school year (Table 3, Figure 3g). The dispensing of contraceptives to girls remained at a stable level (Table 3, Figure 3h).

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## Discussion

This study shows that the use of general practice services and dispensing of prescription drugs was more frequent among 16 – 18-year-olds in the autumn of 2016 when compared to equivalent periods in preceding years. The increase coincided in time with the introduction of new regulations for absence in upper secondary schools, and occurred immediately after the start of the school year. No such changes were observed among 15-year-olds.

We believe there is reason to assume that the increase in the number of consultations and dispensing rate of drugs is associated with the introduction of the new rules for absence. The likelihood of causal associations in epidemiological data is often assessed in light of the criteria launched by Bradford Hill in 1965 [\(10\)](#). Our study clearly complies with the criteria 'strength of the correlation', 'temporality' and 'plausibility'. The requirement for specificity is fulfilled by the increase that was observed among 16 – 18-year-olds who have been exposed to the change of regulations, but not among the 15-year-olds for whom no such change had been made. Since we observed the same effect for both consultations and drugs, the requirement for consistency can also be seen to be fulfilled, although these events are correlated (drugs cannot be dispensed before the patient has been to a consultation). With regard to these requirements for consistency and specificity we can also add that we found an increase in the number of telephone contacts for 16 – 18-year-olds, but not for 15-year-olds.

The data sources used in this study are near-complete and reflect the population's use of general practice services and all dispensing of prescription drugs. The fact that reporting to the KUHR is the basis for reimbursements to the general practice service provides a strong motivation for complete reporting.

The coding quality is likely to vary from one diagnosis to another, but this is of minor importance for this study. Our main analysis, attending consultations, involves no requirements regarding the quality of the diagnoses. Furthermore, we have aggregated the diagnoses into large groups and no analyses of individual diagnoses were undertaken. Data from NorPD provide exact information on all dispensing of prescription drugs from Norwegian pharmacies [\(4\)](#). We have no information on drugs that were prescribed but not dispensed by a pharmacy, hence the data provide no full overview over how drugs are included in the doctors' treatment of their patients.

Health personnel other than doctors, for example physiotherapists, dentists or psychologists, may also document absence for the students [\(2\)](#). Data for these groups of health personnel were not included in our study. Data from the municipal health centres for young people or from services for which the

patient pays the full cost, such as private medical services, were also excluded from our data base. However, such services will account for only a minor part of the total when compared to the general practice and out-of-hours services that have an established pattern of contact with the entire population. We have no information about whether these young people in fact are enrolled in upper secondary schools, but since more than 90 % of the age group 16 – 18 years are enrolled in an educational institution (1), we believe that this lack of information is of secondary importance. Nor can we see any alternative explanatory models other than the introduction of the new rules for absence.

In the autumn of 2016, there was an increase of 41 927 consultations and 17 155 telephone contacts in the general practice services for this age group when compared to the autumn of 2015. For all the country's 4 668 GPs (11), this is equal to nine consultations and four telephone contacts over a period of 18 weeks in average, but we have no data regarding variations between different GPs.

The diagnosis group with the largest increase among 16 – 18-year-olds from the autumn of 2015 to the autumn of 2016 was respiratory tract infections, and the dispensing of antibiotics also increased markedly. A similar increase was not observed among the 15-year-olds. These changes are unlikely to have been caused by an increase in morbidity. Reducing the use of antibiotics in the population by 30 % by the end of 2020 is a national goal, and the greatest part of this reduction will need to take place in the primary health services (12).

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## Conclusion

In the autumn of 2016, the number of consultations in the general practice services increased by 30 % in the age group 16 – 18 years when compared to the previous year. At the same time, the dispensing of prescription drugs to the same age group also increased. These changes are likely to have been caused by the new rules for absence in upper secondary schools.

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