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in cooperation with Gesundes Kinzigtal Ltd., AOK Baden-Württemberg,
and Sozialversicherung für Landwirtschaft, Forsten und Gartenbau
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Editorial

In this issue of our newsletter we continue the reporting on those two evaluation projects which we have presented in the preceding issue: First, we report and analyze further results from the second survey of the GeKiM study (<u>Ge</u>sundes <u>Ki</u>nzigtal – <u>M</u>itgliederbefragung), and second, we present results from the OUM study (over-, under-, and misuse of health services), in which the Cologne-based PMV research group evaluated the quality of health services in the Kinzigtal region on the base of administrative health data from 2004-2011.

In our paper on the second survey of the GeKiM study we focus on the following question: Which aspects predict best (in statistical terms), how strongly patients recommend relatives and friends to become a member of Gesundes Kinzigtal Integrated Care (GKIH). The results of this study are presented on pp. 3-6.

In our contribution on the OUM study we summarize the results of those health care quality indicators which focus on the aspect of over- and misuse of health services. As explained in the preceding issues of the EKIV newsletter, the PMV research group has extracted the indicators of health care quality from administrative data of the statutory health insurers which cooperated with GKIH. Referring to over- or misuse of health services, the PMV research group has extracted five indicators for the time period 2005-11. We summarize the results of these five indicators on pp. 7-12.

One indicator surveyed in the OUM study – the proportion of ambulatory-sensitive hospitalizations – has been focused in greater detail by an internal evaluation of Timo Schulte and Oliver Groene; both work with OptiMedis AG, which is an integral part of Gesundes Kinzigtal Ltd. In their contribution the authors analyze ambulatory-sensitive hospitalizations are above- or below-average in the Kinzigtal region as compared with Germany as a whole (pp. 13-14).

Current data on several aspects of Gesundes Kinzigtal Integrated Healthcare are documented on pages 15 and 16, and recent publications on the evaluation of Gesundes Kinzigtal are listed on page 17.

Your feedback on our newsletter's topics is always welcome. We look forward to answering your email (to <u>achim.siegel@uniklinik-freiburg.de</u>).

With best regards,
Achim Siegel & Wilhelm Niebling

External Evaluation of *Gesundes Kinzigtal* Integrated Healthcare (GKIH):

Selected results of the GeKiM study – second survey, part II: Determinants of insurants' overall satisfaction with GKIH

The main characteristics of the GeKiM study (Gesundes Kinzigtal – Mitgliederbefragung) have been explicated in the preceding issue of the EKIV Newsletter. [1] In this article we analyze, referring to the data of the second GeKiM survey, which aspects explain best – in statistical terms – how strongly GKIH members recommend friends and relatives to become also a GKIH member.

Willingness to recommend a GKIH membership as an indicator of members' overall satisfaction

Like in recent marketing research, we consider the willingness to recommend membership in an organization – here: GKIH membership – as an indicator of members' overall satisfaction with this organization (here: GKIH). This willingness was surveyed in the questionnaire by the following question: „Would you recommend friends or relatives to become a member of Gesundes Kinzigtal?" The possible answers, resembling a Likert scale, read „definitely", „probably", „probably not" or „definitely not". The answers to this question were distributed among the respondents as follows (table 1):

Table 1: Responses to the question „Would you recommend friends or relatives to become a member of Gesundes Kinzigtal?" (second GeKiM survey, overall sample)

Response	count	proportion (%)	valid %
Yes, definitely	329	38.1	39.8
Yes, probably	429	49.7	51.9
No, probably not	57	6.6	6.9
No, definitely not	12	1.4	1.5
Total (valid answers)	827	95.8	100.0
No response	36	4.2	-
Total	863	100.0	-

If we add the proportions of the two top answers „yes, definitely" (39.8%) and „yes, probably" (51.9%), an overall recommendation willingness of 91,7% results (proportion of all valid answers). This means a very high overall satisfaction of GKIH members with GKIH. Thus, overall satisfaction remains on virtually the same high level as in the 2013 GeKiM survey (first survey 2013: 92.1%). If we adjust these figures according to age and sex of all respondents (both in the 2013 and the 2015 survey), we get proportions of 92.0% (2013) and 91.8% (2015).

Bivariate correlations between willingness to recommend a GKIH membership (dependent variable) and selected predictive items (independent variables)

For all following analyzes we interpret the four-level Likert scale of the variable 'willingness to recommend GKIH' (as presented in table 1) as an interval scale. On that premise, we analyze the bivariate correlations between that recommendation willingness on the one hand and other variables or items on the other hand – items which, theoretically, might have an influence on the

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[1] Cf. https://www.ekiv.org/assets/pdf/EKIV-Newsletter/EKIV-Newsletter-2015-2-English-FINAL-Website.pdf.

recommendation willingness. ‚Bivariate' means that the correlation disregards any further inter-correlation that might exist between the dependent (or independent) variable and some third, e.g. intervening or moderating variable(s). The following table 2 shows the result of that bivariate correlation analysis.

Table 2: Bivariate correlations between willingness to recommend GKIH (dependent variable) and selected predictive items (independent variables)

Independent variable (item)	Correlation with item 'willingness to recommend a GKIH membership' (Pearson's r)
Perceived quality of overall health care since GKIH enrollment	0.44**
Knowledge on maintenance of one's own health since GKIH enrollment	0.37**
Overall impression of one's doctor of confidence	0.25**
Perceived own health behaviour since GKIH enrollment	0.24**
Prevalence of individual health goal agreements	0.22**
Participation in GKIH (or DMP) health programs	0.12**
Age	0.12**
Prevalence of chronic illness	0.10**
Female sex	0.07 n.s.
Current state of own health	0.03 n.s.
Duration of GKIH membership	0.03 n.s.

Explications of symbols in Table 2: ** p<0.01; * p<0.05; n.s. – not significant.

The results presented in table 2 may be interpreted as follows: The biggest influence on willingness to recommend a GKIH membership is exerted by the perceived quality of overall health care after having enrolled into GKIH, as compared with health care quality before the enrollment. The concerning question read "How do you feel cared for all in all, regarding your health, since you have enrolled into GKIH?" One of the following answers could be ticked: "All in all I feel considerably worse cared for", „all in all I feel somewhat worse cared for", "nothing has changed", „all in all I feel somewhat better cared for", and „all in all I feel considerably better cared for". The corresponding correlation coefficient (r=.44) shows a relatively strong positive correlation. This means: The better the respondents feel cared for since they have enrolled into GKIH (as compared with before having enrolled), the more strongly they tend to recommend a GKIH membership. Second in rank (r=.37) is the correlation between recommendation willingness and the amount of knowledge which the respondents have acquired on how to maintain their health: The more knowledge they have acquired, the more strongly they tend to recommend a GKIH membership. All other correlations presented in table 2 are weaker than r=0.30. Rank 3 is occupied by the item ‚overall impression of the doctor of confidence' (r=.25), rank 4 by ‚perceived own health behaviour since enrollment' (r=.24), and rank 5 by the prevalence of individual health goal agreements with the respective doctor of confidence (r=.22). The remaining bivariate correlations are small or non-significant.

Determinants of the willingness to recommend a GKIH membership according to a multiple regression

A bivariate correlation analysis does not inform about the influence which a given independent variable has if one or several covariates (intervening in or moderating the relationship between the two variables in question) are considered. Therefore we analyzed whether (and to what extent) the correlations presented in table 2 continued to exist also in a multiple regression. The result of that analysis is illustrated in fig. 1.

Overall correlation: r_{mult}=.50; R^2=.25; N=732

NOT significant: age, duration of GKIH membership, health behaviour since enrollment, current health state, prevalence of chronic illness, participation in GKIH programs

ß=.18

Knowledge on health maintenance

Overall impression of doctor

ß=.16

ß= .10

Female sex

ß=.29

Perceived quality of overall health care since enrollment

Willingness to recommend GKIH
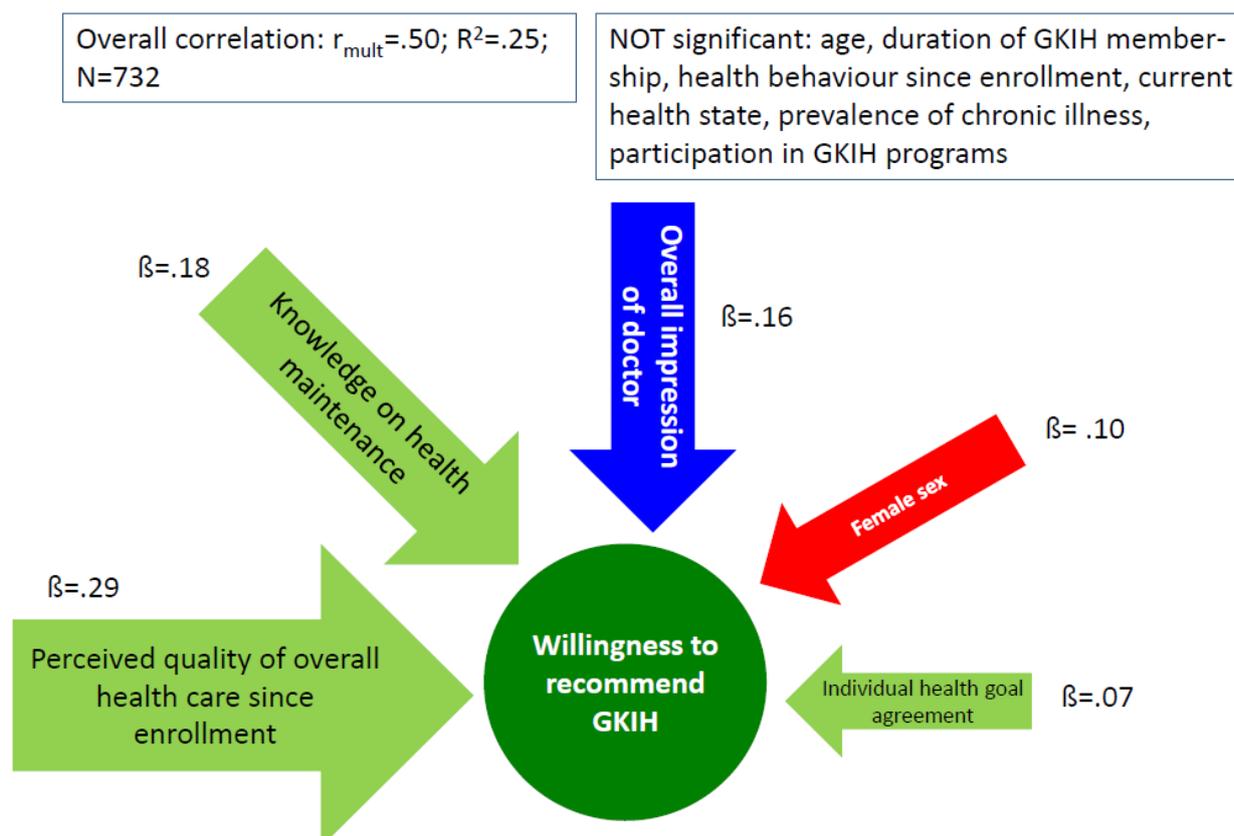
Individual health goal agreement

ß=.07

Figure 1: Independent variables with a significant standardized regression coefficient regarding willingness to recommend a GKIH membership (dependent variable) according to a multiple regression analysis

As figure 1 shows, perceived quality of healthcare since enrollment has the biggest influence on willingness to recommend also in the multiple regression model: The standardized multiple regression coefficient beta (ß), which roughly corresponds to the partial correlation coefficient, amounts to ß=.29 in this case. The second rank is occupied by the amount of knowledge acquired on maintenance of one's own health since enrollment (ß=.18), third in rank is the overall impression of one's doctor of confidence (ß=.16). Considerably weaker – but significant – is the partial influence of (respondents') female sex on the willingness to recommend GKIH (ß=.10), i.e. there is a weak tendency that women recommend a GKIH membership (ceteris paribus) more strongly than men. Still weaker – but statistically significant ($p<.05$) – is the partial influence of individual health goal agreements between doctor and patient (ß=.07). All other variables which have been introduced into the multiple regression have no significant influence.

Summary and conclusion

In this paper we wanted to find out the predictors of patients' willingness to recommend a GKIH membership to relatives and friends. As this willingness may be considered an indicator of patients' overall satisfaction with GKIH, the corresponding predictors may also be regarded as predicting members' overall satisfaction with GKIH. At first we computed bivariate correlation coefficients between the dependent variable 'willingness to recommend GKIH' and several potentially predictive items. Here, the most important independent variable was how respondents perceived the quality of health care since they had enrolled into GKIH (compared to the state before enrollment): The better the respondents' rated health care quality now (in comparison to former times), the more strongly they tended to recommend a GKIH membership. This correlation was comparably high (r=.44). A bit

weaker (r=.37) was the bivariate correlation between willingness to recommend a GKIH membership and the amount of knowledge on how to maintain one's health – knowledge that had been acquired since the respondent had become a member of GKIH. The third rank was occupied by respondents' overall impression of their respective doctor of confidence. The ranking pattern of these three independent variables remained the same when we conducted a multiple regression to check whether the predictors (from our bivariate analysis) remained relevant when considering covariates. In the multiple regression, female sex had also a statistically significant partial influence on the dependent variable, even if this influence was weak (ß=.10). The prevalence of individual health goal agreements between patient and doctor also had a significant, but very weak partial influence on respondents' willingness to recommend a GKIH membership (ß=.07).

Achim Siegel, Wilhelm Niebling

External evaluation of *Gesundes Kinzigtal* Integrated Healthcare (GKIH):

Evaluation of health services by analyzing health insurer's administrative data 2005-2011: Results of indicators measuring overuse/misuse of health services

The PMV research group (Cologne University) has evaluated the quality of healthcare in the GKIH system by relying on health insurers' administrative data (claims data), as we have reported in several newsletter issues.[2] The study was conducted by Dr. Ingrid Schubert and her research team. The evaluation project is based on data of the years 2004-2011. The most important results of this study has recently been published online in *Zeitschrift für Evidenz, Fortbildung und Qualitätssicherung (ZEFQ).*[3] Here we summarize the most important results of indicators measuring overuse or misuse of health services.

Aims and study design of the evaluation study ‚Identification of over-, under- and mis-use of health services – evaluation of health services by analyzing statutory health insurers' administrative data' (OUM study)

Aims and study design of the OUM study have been described in earlier newsletter issues.[4] Therefore we confine ourselves here to a summary.

Aims and design of the study

The OUM study is to survey the administrative prevalence of selected diseases as well as the quality of health services in the Kinzigtal region and a control group, using several indicators of health service utilization and health service quality. The data which are to be analyzed come from two statutory health insurers: AOK Baden-Württemberg (AOK BW) and LKK Baden-Württemberg (LKK BW, now called SVLFG, which means Sozialversicherung für Landwirtschaft, Forsten und Gartenbau). The OUM study conforms to the design of a controlled longitudinal study (trend study with control group); some research questions are analyzed according to the design of a quasi-experimental study (controlled cohort study). Either way, prevalence of diseases and indicators of utilization and health service quality of the Kinzigtal group (intervention group) will be compared with a control group of adult insurants residing in the rest of the federal state Baden-Württemberg (control group).

When comparing disease prevalence, utilization or quality indicators, the results of the control group (abbreviated as 'sample BW') are standardized according to the age and sex distribution of the intervention group (Kinzigtal region), if not stated otherwise. The baseline year is 2005, in some cases 2006. The following years (2006-11 or 2007-11) are considered a time span with a gradually growing intensity of integrated healthcare.

The following analyses are based on the data of insurants who had a contract with their health insurer throughout the year or who deceased during the year. On the contrary, the data of insurants who changed their health insurer during the year were excluded (for the concerning year). As the number of cases of LKK insurants is rather small, the results presented below will refer only to AOK insurants.

In this paper we summarize the results of indicators which measure over- or misuse of health services. Aspects relying on underuse or indicators measuring health outcomes will be focused in later issues of our newsletter.

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[2] Cf. EKIV-Newsletter 1/2010 (https://www.ekiv.org/assets/newsletter/EKIV-Newsletter_2010-1.pdf), pp. 3ff (in German), EKIV-Newsletter 3/2009 (https://www.ekiv.org/assets/newsletter/EKIV-Newsletter_3-2009.pdf), pp. 3ff (in German), EKIV Newsletter 1/2012 (https://www.ekiv.org/assets/newsletter/EKIV-Newsletter_2012-1_English.pdf), pp. 8ff (in English), and EKIV Newsletter 2/2015 (https://www.ekiv.org/assets/pdf/EKIV-Newsletter/EKIV-Newsletter-2015-2-English-FINAL-Website.pdf), pp.8ff.

[3] Cf. http://www.sciencedirect.com/science/article/pii/S1865921716301192.

[4] Cf. Footnote 3. ibid.

Characteristics of the indicators of over- or misuse of health services

At the beginning of the study it had been agreed upon with Gesundes Kinzigtal Ltd. and the two statutory health insurers (which sponsored the study) that one or two quality indicators should be constructed for each of the following health conditions: coronary heart disease (CHD), congestive heart failure (CHF), dementia, depression, diabetes, osteoporosis, and low back pain. Furthermore, some generic indicators of health service quality should be surveyed. All quality indicators were then developed by the PMV research group, by referring to the indicators discussed in the scientific literature or by deferring the indicators from medical guidelines.[5] The following table (table 1) shows the content and the operationalization of indicators on over- or misuse, each one with a short explanation why a given indicator was chosen plus some remarks on data validity.[6] Here as in the following we do not differentiate categorically between overuse on the one hand and misuse on the other because the extensions of the two concepts regularly overlap.

Comparing indicator development in intervention vs. control group: statistical methods

To check whether the development of a given quality indicator in the Kinzigtal region during the time period 2005-11 differed significantly from the corresponding indicator development in the control population (Baden-Württemberg without Kinzigtal region), Poisson regressions were conducted. The results of these regressions were adjusted for age, sex, comorbidity (measured by the Charlson index) in the preceding year and multimorbidity in the preceding year. By means of graphic depiction a continual positive or negative trend was verified; thereafter ‚year' was included as a continual variable into the regression model.

A ‚positive' indicator development (from the perspective of the intervention region) can be supposed if the risk of the intervention population (Kinzigtal population) has been reduced significantly in comparison with the control group (p<.05). The development in the control group represents – as we suppose – the trend within the general population in Baden-Württemberg (relevant comparator). The crucial statistical indicator in the context of a Poisson regression is the relative risk (RR) of the interaction between 'population' and 'year'; the resulting risk figures and their 95% confidence intervals are, then, crucial. The RR reference value (RR=1) is the trend in the control population.[7]

It is not univocally clear which indicator values signify *over*use (in the strict sense of the term) of the respective health services because – to our knowledge – precise and universally accepted reference values do not exist. For this reason we accept the following premise: When comparing big (structurally similar) populations, a lower indicator value indicates a lower amount of overuse whereas a higher indicator value indicates a higher amount of overuse.

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[5] Further details on the selection and construction of the quality indicators used cf. the recent publication, available online: http://www.sciencedirect.com/science/article/pii/S1865921716301192.

[6] For reference sources cf. the online publication http://www.sciencedirect.com/science/article/pii/S1865921716301192.

[7] In this paper we present the statistical calculations in part only. More detailed calculations are to be found in the above-mentioned online publication.

Table 1: Characteristics of the surveyed indicators of over- and misuse of health services

Health service problem	Type of indicator	Definition	Rationale	Validity of the surveyed data
1. Potential physical addiction	P/O	Denominator: Insurants with anxiolytics (ATC: N05BA) and/or sedatives/-hypnotics (ATC: N05CD, N05CF) in at least one quarter of the year; Numerator: Insurants with >30 DDD anxiolytics (ATC N05BA) and/or sedatives/hypnotics (ATC: N05CD, N05CF) in at least one quarter/year	Increased risk of physical addiction	Private prescriptions are not included in the data
2. Risk of increasing antibiotic resistance	P/O	Denominator: Insurants with upper respiratory tract infection (ICD-10: J00-J06) in a given year Numerator: Insurants with upper respiratory tract infection (cf. above) and at least one antibiotic prescription (ATC: J01) in at least one quarter of the given year	Risk of unnecessarily increased antibiotic resistance (by non-indicated prescription)	Good validity because antibiotics are available only on prescription. Because diagnoses are surveyed as 3-digits, mis-coding may largely be excluded
3. Risk of adverse events (AE)	P/O	Denominator: Insurants with at least one NSAID prescription (M01) in the given year Numerator: Insurants with more than 75 DDD NSAR (ATC: M01) in at least one quarter of the given year	Increased ulcer risk	Underestimation of both denominator and numerator cannot be ruled out because NSAR are available over the counter (OTC)
4. Inefficacious pharmaco-therapy in patients with vascular dementia	P/O	Denominator: Patients with vascular dementia (ICD-10: F01, without supplement A/V) in the given year Numerator: Patients with vascular dementia and prescription of herbal anti-dementives (ATC: N06DP) or peripheral vasodilatory agents (ATC: C04) or cholinesterase inhibitors (ATC: N06DA) – but only if no other dementia diagnoses was coded in the quarter in which the prescription was made!	According to guidelines the above-mentioned types of drugs are not recommended for patients with vascular dementia	The coding of the type of dementia cannot be checked effectively. OTC drugs are not considered.
5. Inefficacious pharmaco-therapy in patients with Alzheimer dementia	P/O	Denominator: Patients with Alzheimer dementia (ICD-10: G30 + F00, without supplement A/V) in the given year Numerator: Patients with Alzheimer dementia and selected nootropics / similar prescriptions (ATC: N06BX03, N06DX07, N06DX13, N06DX18, N06DX57, N06DP01, A11AH03, A11JA03, A11JB01, N04BD01) – but only if no other dementia diagnoses was coded in the quarter in which the prescription was made!	According to current evidence the specified drugs may not be recommended in case of Alzheimer dementia (ICD-10: G30 + F00)	The coding of the type of dementia cannot be checked effectively. OTC drugs are not considered.

Explications regarding table 1: P= process indicator, O = potential overuse, DDD – defined daily dosis

Results of indicators referring to a potential over- or misuse of health services

Indicator values in the time period 2005-2011 in intervention and control population

The following table 2 shows the values of the five quality indicators in the baseline year (2005) and the most recent year (2011) of the surveyed time period.

Table 2: Indicator values referring to a potential over- or misuse of health services in 2005 and 2011 in intervention and control population

Indicator	year	Proportion (%) or difference in proportion (% points)				
		KIP (A)	BW* (B)	difference KIP – BW in % points (A-B)	difference 2011 – 2005 in % points	
					KIP ($A_{2011}-A_{2005}$)	BW ($B_{2011}-B_{2005}$)
1. >30 DDD anxiolytics/ sedatives/ hypnotics in at least one quarter/year	2005	37.7	39.5	-1.8	-3.1	-0.4
	2011	34.6	39.1	-4.5		
2. antibiotics in case of upper respiratory tract infections	2005	49.2	50.3	-1.1	-1.3	-0.7
	2011	47.9	49.6	-1.7		
3. >75 DDD in patients with NSAID prescriptions	2005	7.8	9.8	-2.0	-0.7	+0.5
	2011	7.1	10.3	-3.2		
4. Patients with vascular dementia with non-recommended drugs	2005	12.5	6.6	+5.9	-7.0	-1.1
	2011	5.5	5.5	0.0		
5. Patients with Alzheimer dementia with non-recommended drugs	2005	4.4	5.3	-0.9	-3.1	-3.4
	2011	1.3	1.9	-0.6		

Explication of table 2: KIP= Kinzigtal population, BW = control population ,sample Baden-Württemberg (without Kinzigtal)'; all patients have been insured throughout a given year or throughout the year until death; age ≥ 20 years; for the characteristics of indicators in detail cf. table 1.

*) Values for BW are standardized according to the age and sex distribution of Kinzigtal population (≥20 years)

DDD = defined daily doses; NSAID = non-steroidal anti-inflammatory drug

Table 2 demonstrates, among other things, the proportions/values of the five indicators in 2011, the most recent year of the observation period. Thus column 5 shows that only in one of the five indicators – and only for the year 2005 – a proportion was higher in the Kinzigtal population as compared with the control population. This concerns the proportion of patients with vascular dementia who received non-recommended prescriptions (12.5% vs. 6.6%); in 2011, however, the respective proportions were the same (5.5% in both populations). Furthermore, table 2 shows – cf. the last two columns – that four (out of five) indicators decreased more considerably in the Kinzigtal population than in the control population, which means that the decrease of overuse (of the respective health services) was stronger in the intervention population as compared with the control population: Thus, e.g., the proportion of patients with high-dose (or long-lasting) anxiolytics, sedatives or hypnotics prescriptions decreased in the Kinzigtal population by 3.1 % points (from 37.7% in 2005 to 34.6% in 2011), whereas the

corresponding proportion in the control population decreased by 0.4 % points (from 39.5% in 2005 to 39.1% in 2011) – although the baseline value in 2005 was already at a lower level in the intervention population. Only the indicator no. 5 decreased a bit less in the intervention population as compared to the control population (decrease by 3.1% points vs. 3.4% points).

Comparing the trend of over-/misuse indicators in intervention vs. control population

The next table – table 3 – shows the most important results of this paper, answering the question of how over-/misuse indicators developed over time in the intervention population as compared with the control population. The crucial result in table 3 is the relative risk for the interaction 'population x year' for the five indicators. The calculation base for this relative risk has been a Poisson model regression, as outlined above.

Table 3: Relative risk for over-/misuse in the Kinzigtal region in the course of time (time period 2005-11); reference: sample Baden-Württemberg without Kinzigtal population

Indicator	Relative risk (RR) for interaction 'population x year' (95% confidence interval)	P value
1. >30 DDD anxiolytics/ sedatives/ hypnotics in at least one quarter	0.92 (0.82-1.02)	0.1124
2. antibiotics in case of upper respiratory tract infections	1.01 (0.97-1.05)	0.6382
3. >75 DDD in patients with NSAR prescriptions	0.87 (0.78-0.97)	0.0129*
4. vascular dementia with non-recommended drugs	0.52 (0.31-0.89)	0.0172*
5. Alzheimer dementia with non-recommended drugs	1.11 (0.46-2.66)	0.8122

Explication of table 3: cf. explication of table 2; * $p < 0.05$; for the characteristics of the indicators in detail cf. table 1.

The results presented in table 3 may be summarized as follows: In two out of five indicators – i.e. in indicators no. 3 and 4 – the relative risk of the Kinzigtal population decreased significantly (by 0.87 in indicator no. 3 and by 0.52 in indicator no. 4). This means that over-/misuse in the respective health services was reduced significantly in the intervention population as compared with the control population. Furthermore, the relative risk of long-lasting or high-dose prescriptions of drugs which bear a risk of physical addiction (indicator no. 1) was also reduced in the intervention population (by 0.92), but this decrease is not statistically significant (p=.1124). The remaining two indicators (no. 2 and no. 5) do not show any meaningful differences between intervention and control population as the respective p values demonstrate (p=.6382 and p=.8122).

Summary and conclusion

Besides surveying health outcome indicators and indicators of underuse of health services, the PMV research group also surveyed five indicators of over-/misuse of health services. The latter refer to the following five health service problems:

- 1. Prescriptions regarding a long-lasting or high-dose intake of drugs with a high potential of physical addiction
- 2. Prescriptions of antibiotics for patients with upper respiratory tract infections
- 3. Prescriptions regarding a long-lasting or high-dose intake of NSAID (non-steroidal anti-inflammatory drugs)

-    4. Prescriptions of non-recommended drugs for patients with vascular dementia, and
-    5. Prescriptions of non-recommended drugs for patients with Alzheimer dementia

It is not univocally clear what amount (or proportion) of such prescriptions might be consistently qualified as 'over- or misuse' as there are no universally accepted reference values. Nonetheless it seems to be sensible to accept the following evaluation rule: When comparing indicator values among big (structurally similar) populations, a lower indicator value indicates a lower amount of overuse whereas a higher indicator value indicates a higher amount of overuse (and vice versa). Correspondingly, a reduction of indicator values over time means a reduction of over-/misuse in these areas (and ceteris paribus an improvement of health care quality in the respective areas), whereas an increase of indicator values means (ceteris paribus) a deterioration of health service quality in the respective areas.

As to over-/misuse indicators in the OUM study, the decisive result is the following: The Poisson regressions showed a statistically significant reduction of the relative risk of over-/misuse in two (out of five) health service areas for the intervention population as compared to the control population; this holds for indicators no. 3 and no. 4. Furthermore, the analysis of indicator no. 1 resulted in a remarkable, but non-significant tendency of a reduction of the Kinzigtal population's relative risk. As to the remaining two indicators (no. 2 and no. 5), there was no meaningful difference in development of the two study populations. To sum up these results, one may – with respect to the five health service problems analyzed here – conclude a tendency to decrease the relative risk of over-/misuse of health services in the intervention population, i.e. in the Kinzigtal region in the time period 2005-11. As to reduction of over-/misuse of health services, then, the system of Gesundes Kinzigtal Integrated Care seems to be successful.

Besides the 5 indicators on over-/misuse of health services, the PMV research group surveyed 10 indicators on underuse of health services and 3 health outcome indicators (such as, e.g., mortality). The results of these other two groups of indicators will be summarized in later newsletter issues. [1]

Achim Siegel, Ingrid Köster, Ingrid Schubert

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[1] Cf. these results in Schubert et al. 2016 (http://www.sciencedirect.com/science/article/pii/S1865921716301192).

Internal evaluation of Gesundes Kinzigtal Integrated Healthcare (GKIH): Ambulatory care-sensitive hospitalisations

The reduction of unnecessary admissions to hospital is one of the key success factors for integrated care systems. Not least the development of country-specific catalogues of diagnoses which have been classified and validated by medical experts to be ambulatory care-sensitive (Purdy et al. 2009), meaning that these conditions usually do not need to be treated in the hospital setting, has boosted the attention for this field of intervention.

In Germany previous studies estimated an amount of 3.7 million hospital admissions which were classified as avoidable which corresponds about 20% of all cases per year (Sundmacher et al. 2015). Twenty-two diagnosis groups were worked out as a core list, and for each one, medical actions were proposed to reduce correspondent hospital admissions. Strengthening the continuity of ambulatory treatment and providing better access to appropriate professionals in the outpatient sector were considered the most important systemic changes necessary to reduce ambulatory care-sensitive hospitalisations. Integrated care systems are the best setting to implement the activities necessary for change whereby the expected efficiency gains can help to partly regain the necessary investments (Hildebrandt et al. 2015). The results of a comparative analysis of hospitalisation rates for ambulatory care-sensitive conditions between Germany (GER) and Gesundes Kinzigtal Integrated Healthcare (GKIH) give an impression of the possible reductions in cases and the corresponding amount of savings.

The regional population which is included in the integrated care contracts of GKIH comprises nearly 33,000 individuals in the southwest of Germany. Their age and gender distribution is comparable to the mean in Germany (2011: Ø-Age GER: 43.8 vs. GKIH: 43.9; amount of females GER: 51.2% vs. GKIH: 51.6%). To compare the amounts of ambulatory care-sensitive conditions more precisely the number of hospitalisations of GER and GKIH were age-standardized and the amounts in GKIH were then projected on the 80,3 million lives of the *German Standard Population 2011*.

In the Kinzigtal region lower mean hospitalisation rates for 18 of the 22 diagnosis groups of the ambulatory care-sensitive conditions could be observed between 2012 and 2015 (see Figure 1). This shows that there is a potential for reductions in unnecessary admissions which could partly already be achieved by strengthening ambulatory care in GKIH. If the same mean rates like in GKIH would have applied to Germany, about 950.000 cases could have been avoided per year. Valuating each diagnosis group with the mean costs of these hospital cases in Kinzigtal, 2.7 billion Euro could thereby have been saved in Germany per year. And comparing this difference of 950.000 with the overall estimated potential of 3.7 million preventable cases by Sundmacher et al. (2015) it seems that even more could be reached. The biggest difference between Germany and the GKIH projection was found in back pain (-161,000 cases), ischemic heart diseases (-151,000 cases) and hypertension (-97,000 cases) whereas only in these three diagnosis groups about one billion Euro could have been saved. In contrast there are also diagnosis groups in which the GK projection shows slightly higher numbers than usual in Germany like for preventable mental and behavioral disorders (+31,000 cases), depressive disorders (+18,000 cases) and heart failure (+18,000 cases) which should trigger the development of appropriate reactions.

Efficiency gains in integrated care systems can be reached by strengthening the ambulatory sector but at large care coordination between all sectors must also be improved. This is recently still hindered by fragmented remuneration systems. Without changes of the remuneration system it seems impossible to make use of the full potential of the concept of ambulatory care-sensitive conditions and define clear responsibilities for certain treatments.

Mean number of ambulatory care-sensitive hospitalisations (ACSH) per year (based on data from 2012-2015)	Age-standardized cases in thousands, projected on 80.3 million citizens (standard population GER 2011, rounded)			Ø Hosp. case costs (GKIH**) (based on data from 2012-2015)	
ACSH diagnosis group (Core list from Sundmacher et al. 2015)	Hosp. cases GER*	Hosp. cases GKIH**	Δ hosp. cases GER - GKIH (A)	Ø hosp. case costs (B)	Δ Total hosp. case costs (A)*(B)*1000
Ischaemic heart diseases	436	285	151	3.295 €	497.545.000 €
Heart failure	415	433	-18	3.682 €	-66.276.000 €
Other diseases of the circulation system	388	357	31	5.155 €	159.805.000 €
Mental and behavioural disorders due to use of alcohol or opioids	368	302	66	2.625 €	173.250.000 €
Bronchitis & COPD	358	288	70	3.019 €	211.330.000 €
Back pain (dorsopathies)	312	151	161	2.515 €	404.915.000 €
Hypertension	286	189	97	1.648 €	159.856.000 €
Gastroenteritis and other dieseases of intestines	268	188	80	3.016 €	241.280.000 €
Depressive disorders	260	278	-18	2.098 €	-37.764.000 €
Intestinal infectious diseases	264	170	94	3.955 €	371.770.000 €
Influenza and pneumonia	271	255	16	2.202 €	35.232.000 €
Ear nose throat infections	251	225	26	9.127 €	237.302.000 €
Diabetes mellitus	198	174	24	4.896 €	117.504.000 €
Other avoidable mental and behavioural disorders	187	218	-31	7.084 €	219.604.000 €
Soft tissue disorders	186	143	43	2.601 €	111.843.000 €
Gonarthrosis (arthorisis of knee)	183	186	-3	5.814 €	-17.442.000 €
Diseases of urinary system	155	120	35	1.901 €	66.535.000 €
Diseases of the eye	155	116	39	2.406 €	93.834.000 €
Diseases of the skin and subcuntaneous tissue	136	105	31	2.642 €	81.902.000 €
Sleep disorders	122	94	28	894 €	25.032.000 €
Malnutrition & nutritional deficiencies	54	41	13	3.491 €	45.383.000 €
Dental diseases	38	32	6	2.144 €	12.864.000 €
Total	**5.291**	**4.350**	**941**		**2.706.096.000 €**

GER = Germany

GKIH = Integrated Care System *Gesundes Kinzigtal*

* Source = Diagnosis data of hospital patients 2012-2015, Statistical Office of Germany

** Source = Claims-Data of the Integrated Care System *Gesundes Kinzigtal* 2012-2015

Figure 1: Comparison of ambulatory care-sensitive hospitalisations between Germany (GER) and Gesundes Kinzigtal Integrated Healthcare (GKIH)

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Current data on Gesundes Kinzigtal Integrated Care (GKIC) (as of November 2016)

Count of actively enrolled insurants	10.472
- thereof AOK Baden-Württemberg insurants / full members*	9067
- thereof AOK Baden-Württemberg insurants / basic members*	64
- thereof LKK Baden-Württemberg insurants / full members*	426
- thereof friends of Gesundes Kinzigtal **	915

* Basic members differ from full members in that their family doctor („doctor of confidence") does not have a cooperation contract with GKIC.

** Friends of Gesundes Kinzigtal are insurants of other health insurers which do not have a contract yet with Gesundes Kinzigtal

Count of patients with higher morbidity risk	5.110
- thereof insurants of AOK Baden-Württemberg	4826
- thereof insurants of LKK Baden-Württemberg	284

GKIC preventive programmes and national disease management programmes (DMPs)	count of participants
Smoking cessation („Rauchfreies Kinzigtal")	251
Prevention/treatment of congestive heart failure („Starkes Herz")	98
Lifestyle intervention for patients with metabolic syndrome („Gesundes Gewicht")	235
Prevention of osteoporosis and osteoporotic fractures („Starke Muskeln – feste Knochen")	1012
Early intervention by psychotherapists in cases of acute personal crises („Psychotherapie akut")	587
Specific medical care for the elderly in nursing homes („Ärzte plus Pflege")	169
Back pain prevention programme („Starker Rückhalt – Mein gesunder Rücken")	81
Patient coaching	53
Specific intervention for patients with depression („Besser gestimmt")	29
Ophtalmological check-up for children - U10 - U11 - amblyopia	 557 446 172
Individually blistered drug packages („Medifalter-Markttest") – closed	104
Wound management („Gut verbunden") – in abeyance	4
AGil (Active health promotion in the elderly) – in abeyance	511
Electronic health card – in abeyance	1300
DMP diabetes mellitus type II	1006
DMP coronary heart disease	352
DMP breast cancer	23
DMP asthma	113
DMP COPD	181
Members of the network 'healthy enterprises' (count of enterprises)	12
People who have participated in a program or activity of GKIC	20.541

Other programmes offered in cooperation with AOK specialists or third parties	count of participants
Social service (case management by social workers according to GP's recommendation)	358
Diet counselling by AOK BW specialists	106
Specific fall prophylaxis for the elderly	159
Aqua fitness	3650
Health workshops for pupils	71
Sponsored membership in sports clubs	466
People participating in 'gesund & aktiv' classes	837
Lecture series on health issues (since 2009)	5006

Physicians and other providers contracting with GKIC	93
- GPs/family physicians	30
- specialists	24
- pediatricians	1
- psychotherapists	6
- hospitals	6
- physiotherapists	10
- nursing homes	11
- outpatient nursing services	5
- social-therapeutic services	1
Other partners cooperating with GKIC	**81**
- pharmacies	16
- sports clubs	42
- fitness centres	6
- others	17

Recent publications on the evaluation of Gesundes Kinzigtal Integrated Healthcare (March 2015 until October 2016)

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