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EIROPAS SAVIENĪBA
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IEGULDĪJUMS TAVĀ NĀKOTNĒ

Eiropas Savienības fondu darbības programmas "Izaugsme un nodarbinātība" 9.2.3.specifiskā atbalsta mērķa "Atbalstīt prioritāro (sirds un asinsvadu, onkoloģijas, perinatālā un neonatālā perioda un garīgās veselības) veselības jomu veselības tīklu attīstības vadlīniju un kvalitātes nodrošināšanas sistēmas izstrādi un ieviešanu, jo īpaši sociālās atstumtības un nabadzības riskam pakļauto iedzīvotāju veselības uzlabošanai" ietvaros īstenotā projekta Nr.9.2.3.0/15/I/001 "Veselības tīklu attīstības vadlīniju un kvalitātes nodrošināšanas sistēmas izstrāde un ieviešana prioritāro jomu ietvaros" 3. un 4.nodevums –

Summary Report of Bottleneck Analysis and survey instruments, manuals and analysis protocols

World Bank Reimbursable Advisory Services:

Support to Develop a Health System Strategy for Priority Disease Areas in Latvia

Bottleneck Analysis[1]

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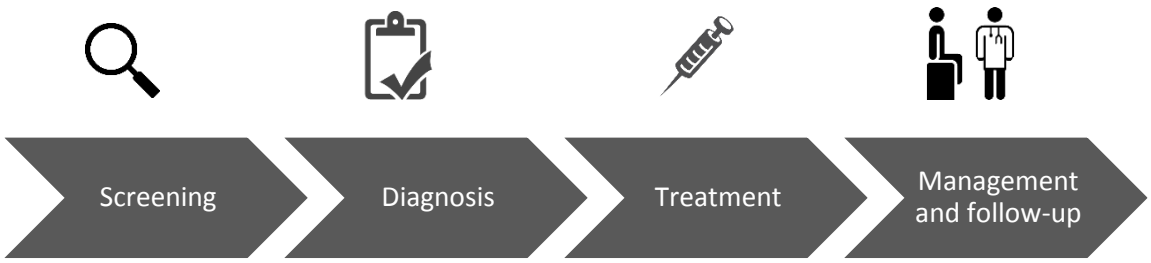
INTRODUCTION

Relative to other countries, Latvia exhibits excess mortality and morbidity in four areas – cardiovascular disease, cancer, mental health, and maternal and perinatal health, and these conditions have become priorities in the health sector's ongoing reform agenda. This study, along with a number of other reports prepared by the World Bank, use these four diseases areas as a lens to identify underlying performance issues in the health system that may impede patients' timely access to services and depress quality of care.

While the other analytical pieces examined policy, practice, and capacity in particular functional domains, such as provider payments and quality assurance, this report focuses on patients and how they move through the health system. It is an empirical investigation of available administrative data and aims to trace out a patient pathway, starting from screening and ending with follow-up care, in order to identify where patients may be getting stuck and which elements of the pathway are bottlenecks that prevent patients from the getting the care they need when they need it (Figure 1). For example, does excess mortality in cancer more likely stem from late diagnoses or late treatments? Are cardiovascular patients diagnosed late or are they missing appropriate follow-up care?

Figure 1: The patient pathway



This report also tests some general hypotheses suggested in the other accompanying studies, examining whether there are delays between the steps along the patient pathway, whether the steps themselves are carried out in the appropriate settings, and whether patients receive high quality care.

The findings suggest that each disease area faces a unique mix of challenges. Follow-up care appears weak among cardiovascular patients, for example, while screening and timely diagnosis seem to be major bottlenecks in cancer care. Mental health patients likely encounter bottlenecks all along the patient pathway, while deficits in screening and management during the prenatal period may explain Latvia's relatively high rates of perinatal mortality.

It is important to note that because of the high use of privately financed care in Latvia, it is not possible to completely track patients as they move through the health system, since there is no central repository of information on all health care delivered in Latvia. Individual-level data on privately financed care sits with each service provider, often in paper form. Nevertheless, as described in more detail below, the study employs all payment data of the National Health Service (NHS), which has

ostensibly been set up as a single payer. Thus, it is important to gauge how much care the NHS is funding along the patient pathway. While any observed deficits could reflect a prominent role played by the private sector for a particular step in the pathway, they also indicate that the NHS is not paying for an entire package of essential care.

The next section describes the basic methods used in the analysis, including a description of the files that have been submitted so that the analysis could be replicated on any computer that has the appropriate software and the raw data files shared with the World Bank by the NHS, the Center for Disease Prevention and Control (CDPC), and the State Emergency Services (SEMS). The subsequent four sections present the main findings from the four priority conditions and general recommendations for addressing some of the bottlenecks that have been observed, while the final section describes data-related challenges that the Ministry of Health may want to address in order to monitor system-level bottlenecks in the future. Four appendices present all of the assumptions that underlie all of the results presented in the report and form an "operational manual" to guide future analyses of the data generated by Latvia's health system.

METHODS

The study uses administrative data provided by the NHS, CDPC, and SEMS to assess performance related to the steps of the patient pathway in Figure 1 – screening, diagnosis, treatment, and management and follow-up care - for select tracer conditions. The analysis required identifying all patients with these tracer conditions and determining the receipt and timing of certain services corresponding to screening, diagnosis, treatment, and disease management or follow-up care.

Tracer conditions

An exhaustive study of each disease area would have been beyond the scope of the present study, so tracer conditions within each disease area were used to illuminate performance issues that could be common to other conditions within the same disease area. Just as a radioactive tracer in medicine allows a physician to track progress through a certain organ system, a tracer condition in this study permits the tracking of performance through the multiple functions of the health system listed in Figure 1. Table 1 lists the tracer conditions used for each disease area. While high risk pregnancy was originally intended to serve as a tracer for perinatal health, the analysis ultimately examined all pregnancies since without additional clinical information about the patient, it is difficult to determine what a medically ideal pathway would look like for a high risk pregnancy. Instead the study examines differences along the pathway exhibited by mothers who have experienced a perinatal death and those who have not.

Table 1: Tracer conditions

Condition	Tracers
Cardiovascular disease	Hypertension, diabetes, acute myocardial infarction, and stroke
Cancer	Breast cancer, cervical cancer, and colorectal cancer

Mental health	Depression and substance abuse
Maternal and perinatal health	None

Source data

The analysis uses multiple data sets shared by the NHS, CDPC, and SEMS, which are listed in Table 2.

Table 2: Data sets used in the analysis by source

Data set	Source
All inpatient services paid by the NHS, 2009-2014	NHS
All outpatient services paid by the NHS, 2009-2014	NHS
All health care staff and their certifications	NHS
Cancer Registry, 2009-2014	CDPC
Death Registry, 2009-2014	CDPC
Perinatal Death Registry, 2009-2014	CDPC
Diabetes Registry, 2009-2014	CDPC
Mental health registry, 2009-2014	CDPC
Substance abuse registry	CDPC
Emergency calls	SEMS
Cancer screening letters	NHS

These data sets were shared in Excel format. All personal IDs had been anonymized following a protocol outlined in a legal agreement among NHS, CDPC, and SEMS. The World Bank stored and analyzed all data on two secure servers. For the analysis, all data were imported, cleaned, and merged when necessary using Stata/MP 14.2 software.

Replicability

The Stata code for importing, cleaning, merging, and analysis has been written so that all analyses can be fully replicated on any computer that has Stata software and all of the raw data furnished by the NHS, CDPC, and SEMS. Two files in particular (*00-master_path.do* and *01-master_run.do*) can be used to replicate every figure that appears in this report (and in a supplementary PowerPoint that contains more indicators), starting from the raw data, as they execute all data cleaning tasks, all database and variable construction, and every calculation in the correct sequence.

Not only does this set up for replication offer a high degree of transparency, but it will also allow others to easily modify assumptions made in the analysis and recalculate any figure fairly quickly.

Appendix 1 describes the calculation of each indicator presented in this report.

Identifying patients with tracer conditions

To construct lists of patients exhibiting a certain tracer condition – for example, all hypertension patients for a given year – we searched all possible databases – namely, the inpatient and outpatient records, the SEMS data sets, the disease-specific registries, and the death registry since it is possible for patients to be diagnosed outside of inpatient or outpatient settings. Patients who had made little contact with health services or remained undiagnosed despite seeking medical attention could be diagnosed with a certain condition for the first time only at death or during an encounter for emergency services. A patient was considered to have a disease in a given year if (s)he appeared in any database that year with the ICD-10 code (or equivalent SEMS code) corresponding to that disease.

The NHS cautioned that this strategy for identifying diagnosed patients could yield a number of false positives as physicians could record ICD-10 codes associated with a confirmed diagnosis for suspected cases rather using the separate code that exists for suspected cases.[2] Indeed this is the rationale behind the NHS strategy for identifying hypertension patients, for example, of searching for at least two outpatient instances or one inpatient record corresponding to the hypertension diagnosis code. As the number of cases where a patient appears only once with a diagnosis in a single year is small and as physicians in Latvia do appear to use ICD-10 codes corresponding to suspected cases, the subsequent analysis does not impose the NHS restriction of having at least two outpatient instances or one inpatient record for each tracer.[3] For cancer cases, however, some indicators only include patients that appear in the Cancer Registry. Appendix 4 lists the ICD-10 codes used for each tracer.[4]

Determining receipt and dates of services

These lists of patients diagnosed with the tracer conditions were then merged with the inpatient and outpatient patient records, including "manipulations" (the term for billable expenses, which can include examinations, diagnostics, treatments, and procedures), and with a data set of physicians with their corresponding specialties. This permitted an assessment of the extent to which patients with certain diagnoses received certain manipulations, the timing of these services, and the identity of the physician providing them. Appendix 2 presents the codes used to identify specialists in a particular domain (for example, mental health specialist). Appendix 3 also lists the manipulation codes corresponding to each examination, diagnostic, treatment, and procedure used in the analysis.[5]

[2] For example, they could use the code C50 meant for confirmed malignancies of the breast even though prior to confirmation, they could use D49.3, N63, D48.6, or Z12.3.

[3] For example, only 4 percent of patients diagnosed with diabetes had only one outpatient record in 2014, only 7 percent of those diagnosed with hypertension, and less than 4 percent for cancers. For depression and substance abuse and depression, these fractions rise to 13 and 22 percent, respectively.

[4] It is important to note that errors of commission (in which ICD-10 codes currently not in use in Latvia were used in the analysis) will not change any of the results. The algorithm would search for patients with these codes in the databases supplied by the NHS, CDPC, and SEMS and simply not find any.

[5] It is important to note here as well that errors of commission (using too many manipulation codes to identify a procedure, examination, or laboratory test) will either have no effect (when no patients have received the erroneous manipulations) or will inflate the corresponding indicator, making the situation appear better than it really is (when the erroneous manipulations are frequently received).

Unless otherwise stated, all reported figures have used all data sets to identify patients exhibiting the tracer condition and NHS inpatient and outpatient data to identify the receipt and timing of services. The NHS has cautioned that services may be recorded with some delay, but the dates in the payment data may be the most accurate representation of the timing of visits and services, as the CDPC has cautioned that the dates in the registries may be recorded with even greater delay. To deal with this uncertainty, many indicators use multiple time spans (for example, 30, 60, and 90 days) to characterize the timing of services.

CARDIOVASCULAR CONDITIONS

Tracer conditions: *Hypertension, diabetes, acute myocardial infarction (AMI), and stroke*

Summary of empirical findings

With no organized screening programs, performance in this dimension cannot be observed for cardiovascular conditions without detailed clinical information, which is not present in currently available data. The current surveillance of the health of the Latvian population by the Center for Disease Prevention and Control also provides suggestive evidence that sizable fractions of a high risk group (males between the ages of 45 and 54) are not getting their blood pressure (nearly 40% not getting it) or cholesterol measured on an annual basis (more than 60% not getting it) (Figure 2).

The lack of clinical information also limits an assessment of diagnoses. However, it does not appear that missed diagnoses largely contribute to excess mortality in cardiovascular disease. According to the NHS payment data, in 2013, only 9% of AMI patients did not have a diagnosis of coronary artery disease in the same year, and only 16% of stroke patients had not been diagnosed with hypertension in that year.

Without standardized coding of pharmaceutical products, data on whether or not physicians have made a prescription, and the exact times of medical interventions within hospitals, currently available administrative data also provides little visibility on the quality of treatment for cardiovascular patients. Mortality outcomes for AMI and stroke patients, however, suggest that Latvia struggles with the treatment part of the patient pathway (Figures 3 and 4), as Latvia has among the highest rates of 30 day mortality following admission to a hospital for both AMI and stroke.

The data are clear that disease management and follow-up care pose significant challenges in Latvia. Patients diagnosed with hypertension and diabetes are far from full compliance with the basic tests used to monitor the progression of disease, such as electrocardiograms and creatinine and glucose blood tests, and cholesterol tests (Figures 5-7). It is important to note that these patients are making frequent contact with the health system - an average of 7.5 primary care visits per year for hypertension patients and an average of 8.3 for diabetes patients (Figures 8 and 9) – and thus their diseases are not being appropriately managed.

More alarmingly, there is little follow-up care after major cardiovascular incidents. In all years, more than 80% of patients discharged with an AMI do not see a cardiac specialist within 90 days (Figure 10). While these patients might be seeking care from private specialists, it is still the case that the NHS does

not pay for critical follow-up care for more than 80% of patients who have had a heart attack. Less than half of the patients who do see a specialist within the 90 day interval see him/her within a month of discharge. The follow-up pattern appears nearly identical for stroke patients (Figure 11). Within 90 days of discharge, more than 80% have not seen a neurologist, and only half of those who do obtain follow-up care get it within 30 days. Shortages of physicians cannot explain these patterns, as the human resource mapping found surpluses of cardiologists in all regions, except Vidzeme (where there is neither a surplus nor a deficit).

Recommendations


To monitor performance related to prevention and screening, the Ministry of Health, along with the Health Inspectorate and medical faculties, may consider clinical audits through chart reviews or the use of unannounced standardized patients.

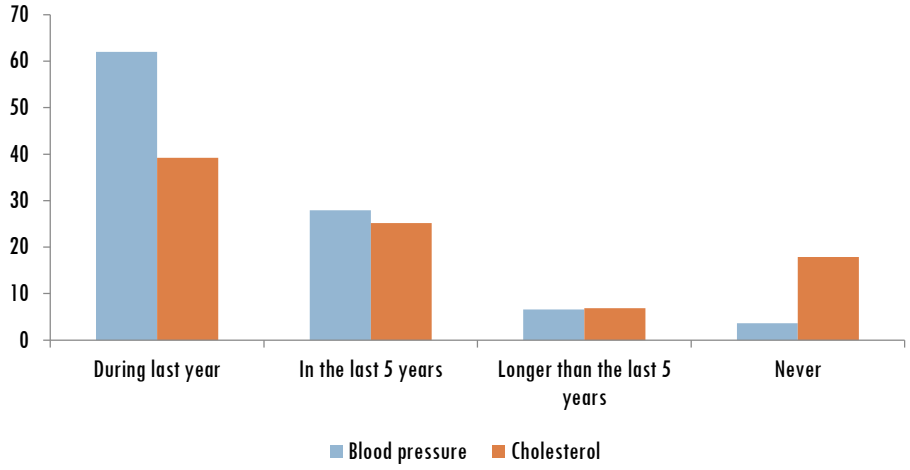

The Ministry of Health may also consider implementing the World Health Organization's STEP survey in Latvia, which would permit the estimation of the true prevalence of hypertension and diabetes and diagnosis rates, in addition to drug adherence.


Clinical audits within hospitals, along with requiring hospitals to report the exact timing of interventions and tests that take place within the hospital, could help identify why outcomes for AMI and stroke patients are so poor in Latvia. Currently, the NHS payment data only contains information on the day a procedure or test has been performed. As the accompanying hospital-volume study also suggests, volume-based standards for physicians may also decrease mortality among patients undergoing percutaneous coronary interventions and abdominal aortic aneurysm repairs. It is also possible that older physicians have found it difficult to implement the latest international standards of care and may require more intensive continuing medical education. The accompanying human resource mapping exercise found that nearly 60% of cardiologists are 55 years or older and that 20% are older than 65 years.


Given that a large majority of heart attack and stroke patients are not getting follow-up care, the NHS may consider exempting these patients from quotas (that is, their consultations would not count against a quota). Hospitals and physicians may also need explicit financial incentives – for example, bundling the payment for treatment with the payment for follow-up - to provide timely follow-up care following an AMI or stroke, and it would be worth experimenting with such incentives to evaluate whether they can work. Given that increasing the NHS's strategic purchasing function is part of the current reform agenda in Latvia, bundling payments for treatment and follow-up could be an initial effort to link payments to quality of care.

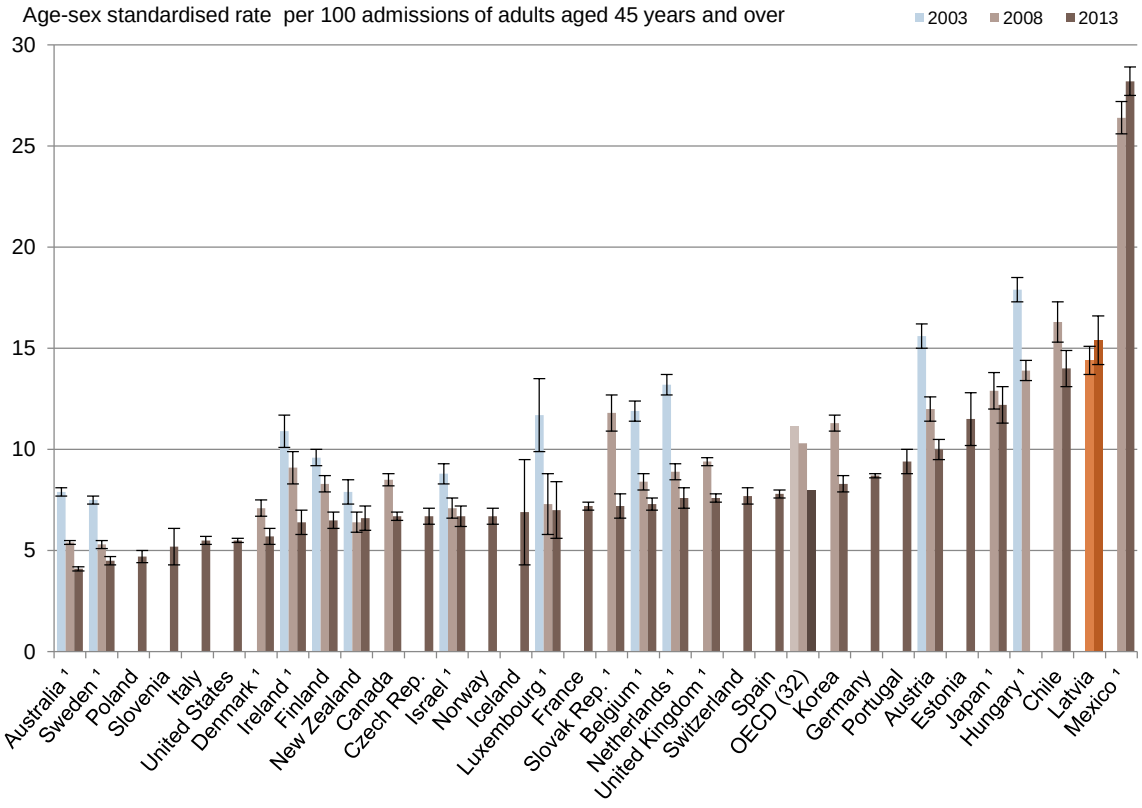
Main findings

Figure 2: Fraction of men aged 45-54 years who have had their blood pressure and cholesterol measured



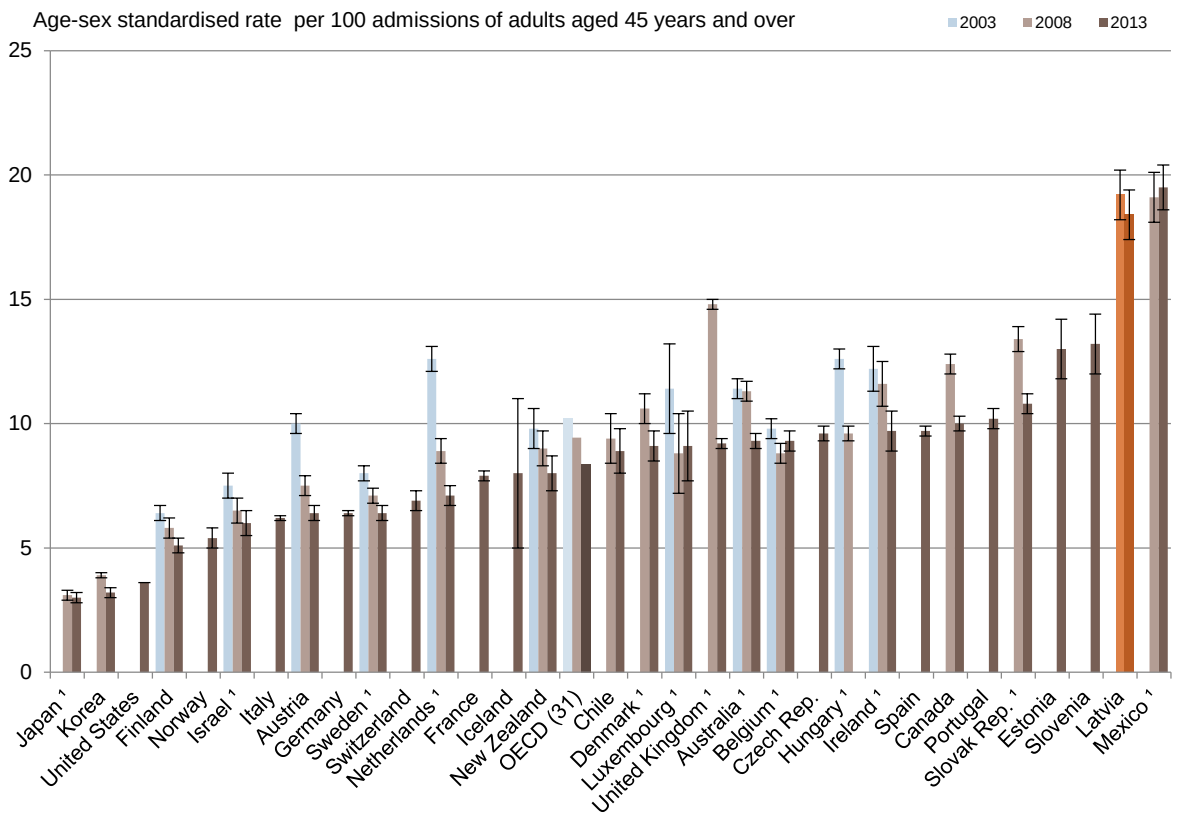
Source: Center for Disease Prevention and Control (2012) Health Behavior Among the Latvian Population

Figure 3: Thirty-day mortality after admission to hospital for AMI based on admission data, 2003 to 2013 (or nearest years)



Source: OECD Health Statistics 2015, http://dx.doi.org/10.1787/health-data-en.

Figure 4: Thirty-day mortality after admission to hospital for ischemic stroke based on admission data, 2003 to 2013 (or nearest years)



Source: OECD Health Statistics 2015, http://dx.doi.org/10.1787/health-data-en.

Figure 5: Percentage of hypertension patients who had an annual electrocardiogram

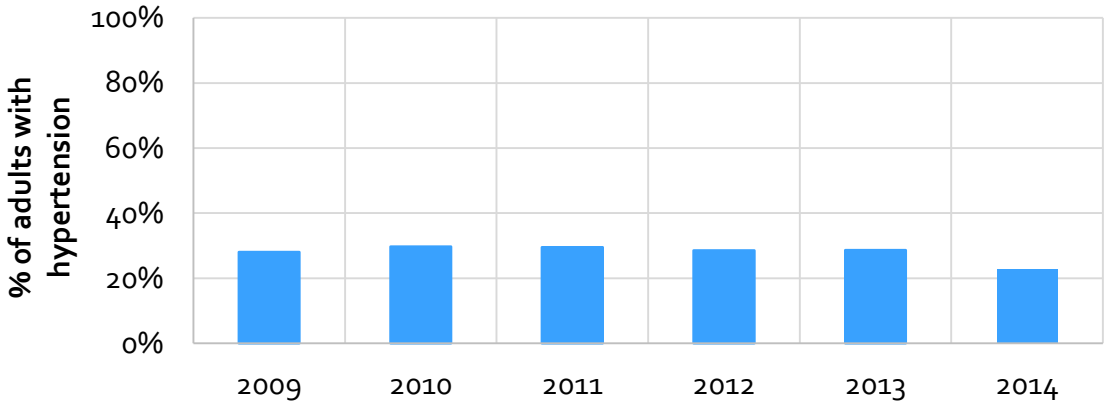


Figure 6: Percentage of hypertension patients who had annual microalbuminuria, random blood glucose, and creatinine tests

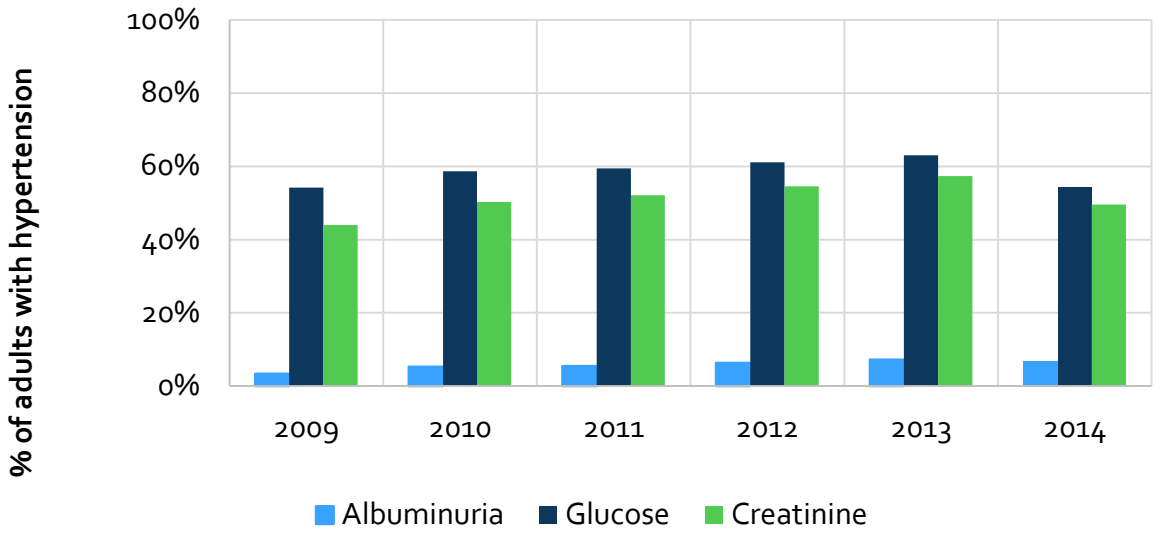


Figure 7: Percentage of diabetes patients who had annual microalbuminuria, HgA1c, and creatinine tests

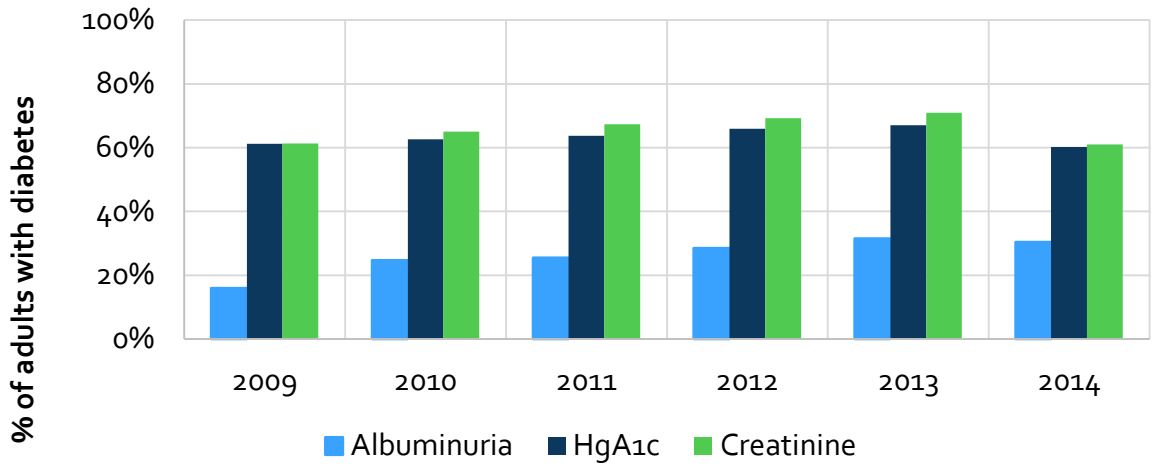


Figure 8: Number of outpatient visits to GP per year for people diagnosed with hypertension

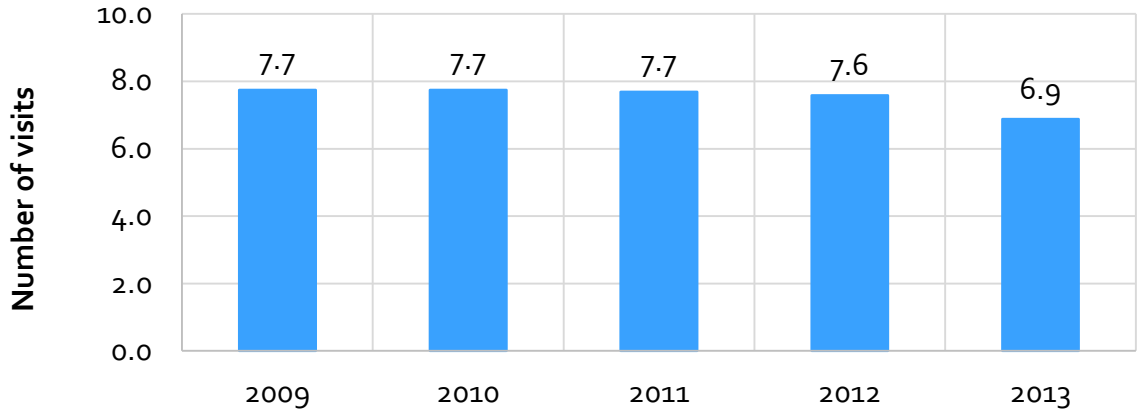


Figure 9: Number of outpatient visits to GP per year for people diagnosed with diabetes

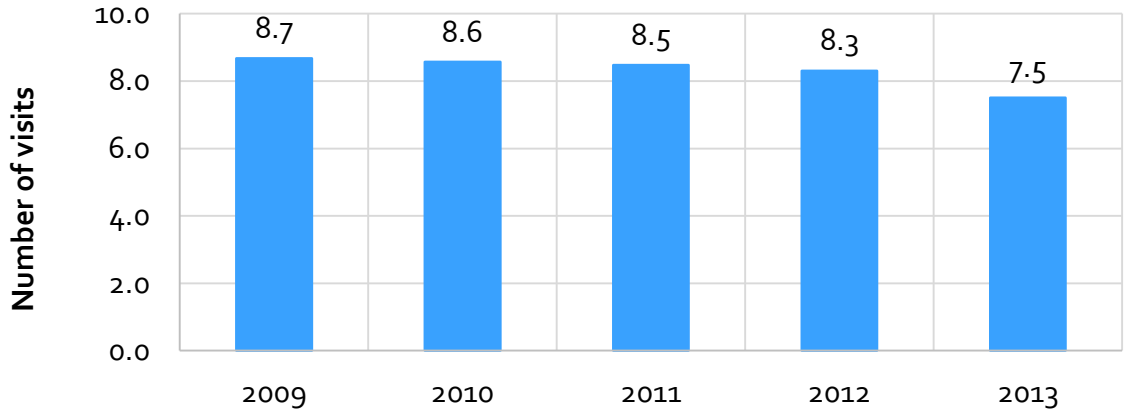


Figure 10: Timing of first follow-up visit with a cardiologist for inpatient discharges with an AMI diagnosis

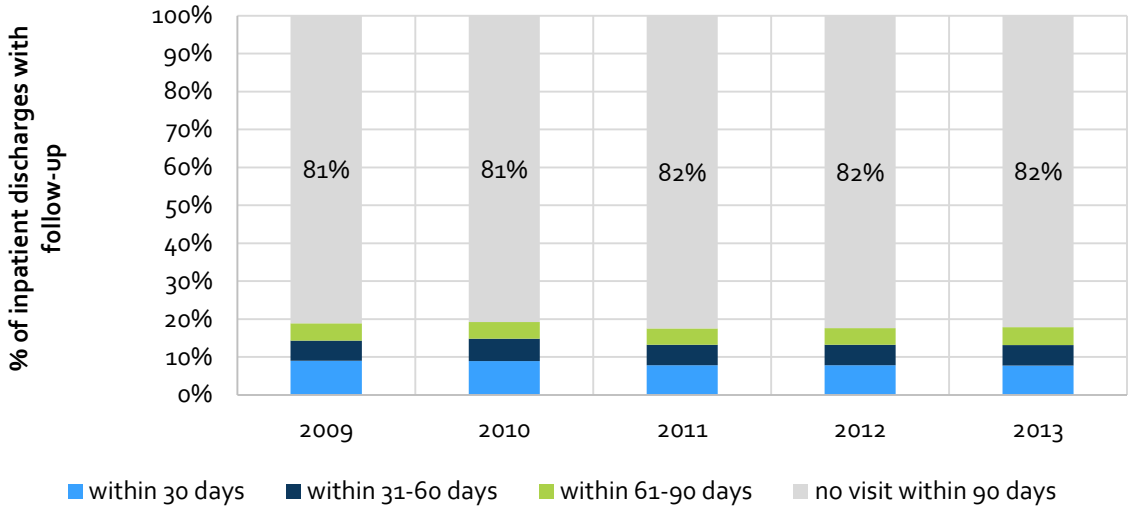
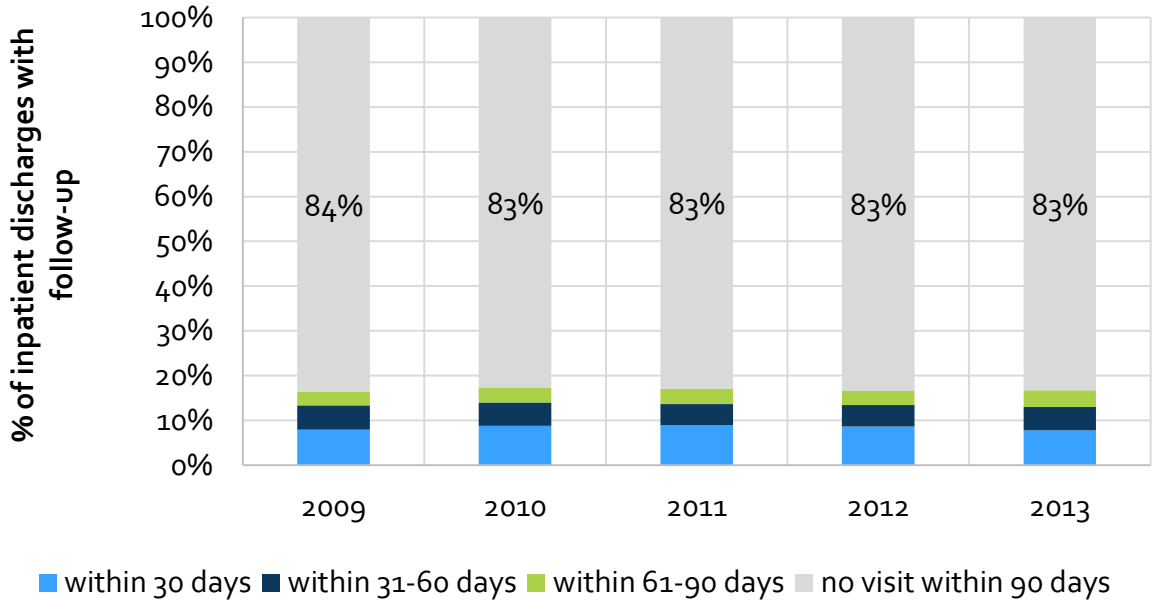


Figure 11: Timing of first follow-up visit with a neurologist for inpatient discharges with a stroke diagnosis



CANCERS

Tracer conditions: Breast cancer, cervical cancer, and colorectal cancer

Summary of empirical findings

There is considerable room for improvement in publicly funded cancer screening in Latvia. While it is remotely possible that the private sector accounts for the more than 40% of women aged 50-69 who do not have mammograms every two years through NHS-contracted services (Figure 12) and the nearly 60% of women aged 25-70 who are not screened for cervical cancer every three years (Figure 13), this certainly cannot be the case for colorectal cancer, where less than 10% of individuals aged 50-74 are meeting the EU guideline of yearly fecal occult blood tests (FOBT) (Figure 14). To put this figure in perspective, FOBT compliance rates in other European countries can be as high as 42% (France), 45% (Italy), 52% (United Kingdom), and 71% (Finland). [6]

Perhaps due to this poor screening coverage, cancer diagnoses are occurring late. Only around 30% of breast cancer patients are being diagnosed in early stages of their disease, Stages 0 and 1 (Figure 15). In fact, women are slightly more likely to be diagnosed when they have already progressed to Stage III or IV of their disease. Cervical cancer fares a little better, as nearly half of staged cancers are Stage 0 or Stage I (Figure 16). In each year, more than half of staged colorectal cancers are Stage III and Stage IV (Figure 17).

When it comes to treatment, however, there do not appear to be major delays. In the NICE referral guidelines for suspected cancer cases adopted by the National Health Service of the United Kingdom, there should be no more than two months between a GP's referral for suspected cancer and the onset of treatment and no more than 31 days between the drafting of a treatment plan and the start of treatment. As discussed earlier, it is difficult to discern the precise date of diagnosis with available data in Latvia. Nevertheless, among patients that do receive treatment, the average time elapsed between the first appearance of a confirmed cancer diagnosis in health system data and the first cancer treatment is 35 days for breast cancer, 49 days for cervical cancer, and 40 days for colorectal cancer (Figures 18-20).

The treatments that cancer patients are getting appear to be moderately successful when Latvia is compared to OECD countries. Despite the late diagnoses, the five-year relative survival rate for breast cancer in Latvia (84.2) is near the OECD average (84.9) (Figure 21), as are the rates for colorectal cancer (Figure 22). The corresponding rate for cervical cancer, however, suggests some room for improvement

[6] Miroslav Zavoral, Stepan Suchanek, Filip Zavada, Ladislav Dusek, Jan Muzik, Bohumil Seifert, and Premysl Fric (2009), "Colorectal cancer screening in Europe," *World Journal of Gastroenterology*, 15(47): 5907–5915.

in treatment. Women diagnosed with cervical cancer in Latvia, for example, are only 58.5% as likely to live for another five years as women their same age who had not been diagnosed with cancer, compared to an OECD average of 66% (Figure 23).

Without clinical information, it is difficult to assess the extent to which cancer patients in Latvia receive appropriate follow-up care. Evidence from the accompanying review of the benefits package suggests that an important co-morbidity of cancer – namely, depression - is being overlooked. The American Cancer Society and the National Cancer Institute in the United States estimate that depression affects approximately 15 to 25% of cancer patients, yet at most 2 percent of patients with active breast, cervical, or colorectal cancer diagnoses in Latvia have been diagnosed with depression in any given year. In the accompanying qualitative study, palliative care also surfaced as an issue for patient organizations, which felt that cancer patients did not receive sufficient care related to pain management in their last days of life.

Recommendations

The letters that the NHS currently uses for women who have not been screened recently for breast and cervical cancers appear to have a decent response rate (Figures 24 and 25). To increase the take-up rates of breast cancer and cervical cancer screening, it might be worth experimenting with the format of the letters (specific wording, the identity of the sender, the use of social reference points) and the use of text message reminders, as these ostensibly small modifications have proven effective in improving responses in other domains, such as payment of taxes, savings, and drug adherence.[7] The NHS could also consider switching from the current practice of opportunistic screening for colorectal cancer to more organized screening.

Improved screening for breast, cervical, and colorectal cancers should help decrease the fractions of patients diagnosed in late stages for these diseases. If the Latvian health sector does start developing clinical guidelines and clinical pathways, a referral guideline for suspected cancer cases should help identify cases that could be exempt from quotas on important diagnostics, such as biopsies. As demonstrated in the accompanying review of the benefits package, the number of biopsies performed throughout the year tracks the schedule of quotas, which likely contributes to delays in diagnosis for patients suspected of cancer in months in which quotas have been exhausted.

[7]World Bank (2015), *World Development Report 2015: Mind, Society, and Behavior*, Washington DC, World Bank.

Main findings

Figure 12: Percentage of women (50-69) receiving 2 -yearly screening mammogram

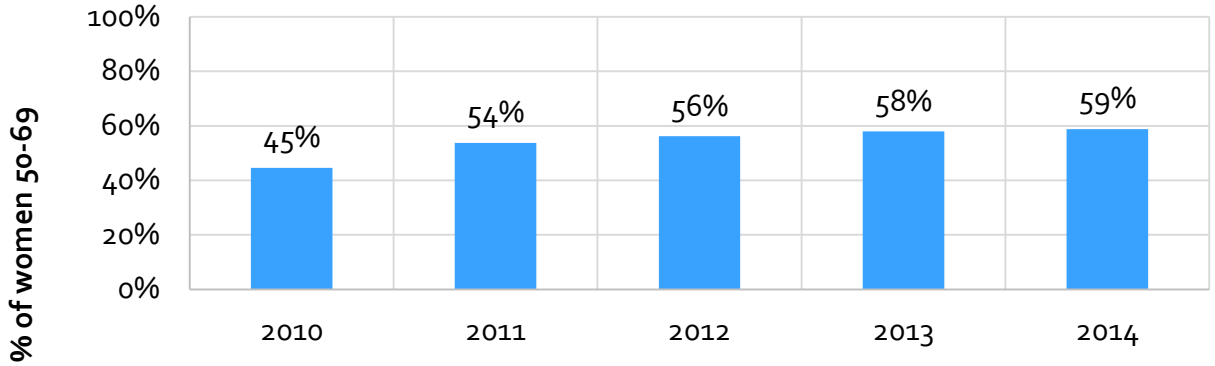


Figure 13: Percentage of women 25-70 screened for cervical cancer every 3 years

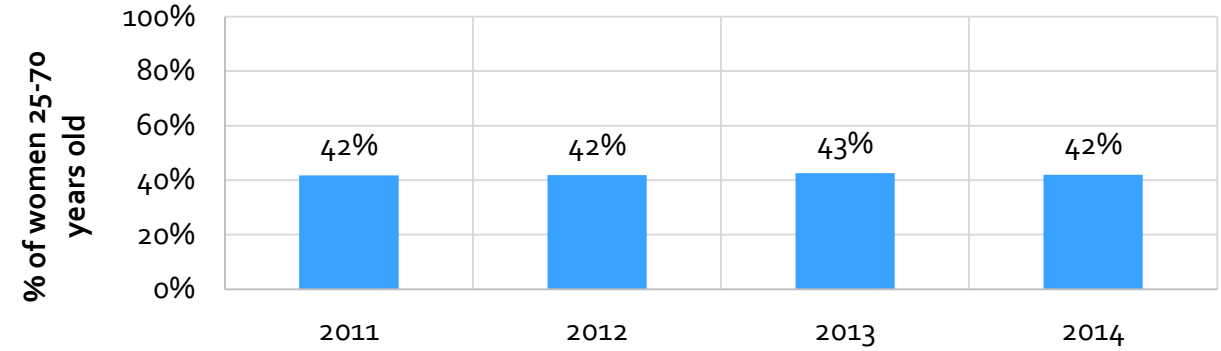


Figure 14: Percentage of 50-74 year olds receiving FOBT within the last year

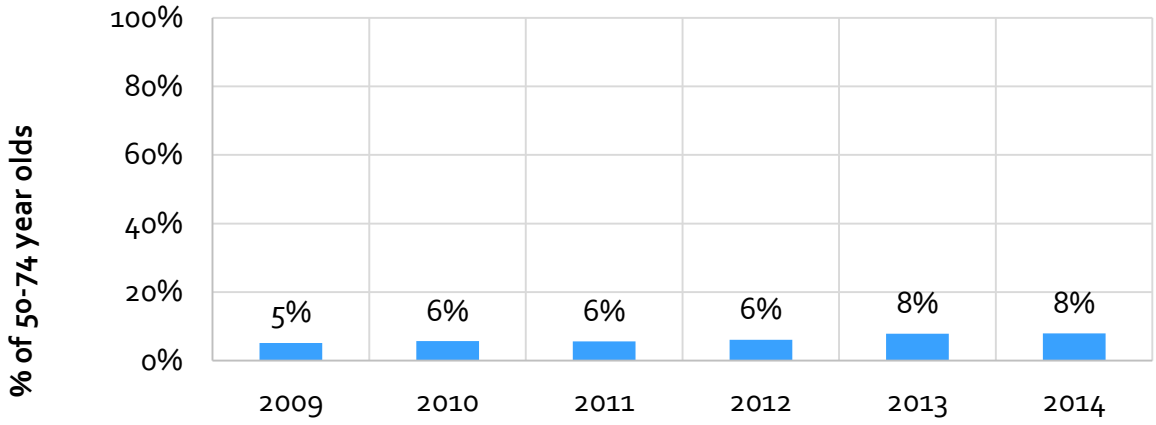
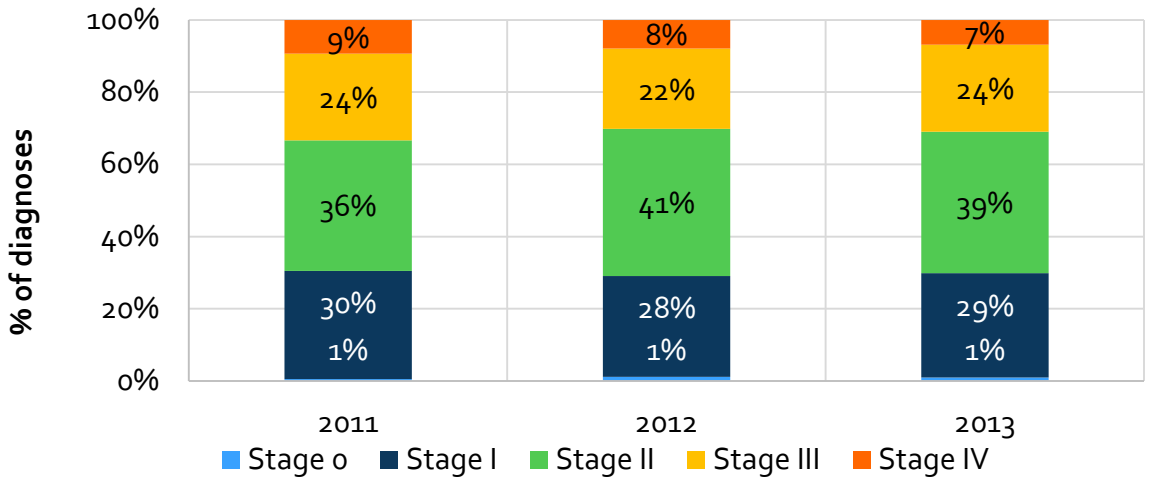
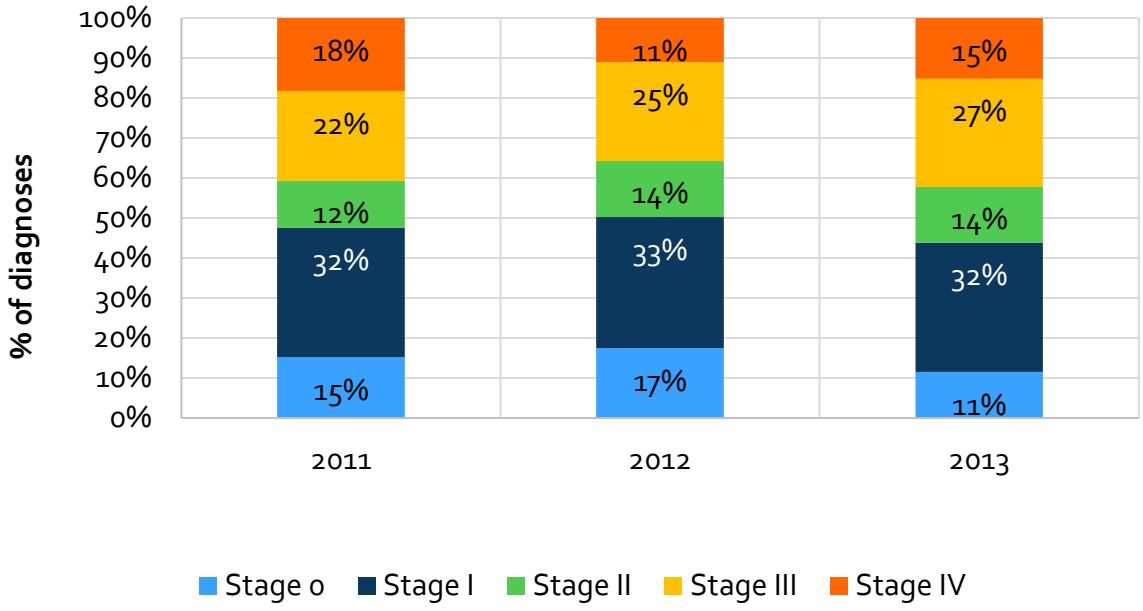


Figure 15: Percentage of breast cancers diagnosed at each stage, conditional on stage being known



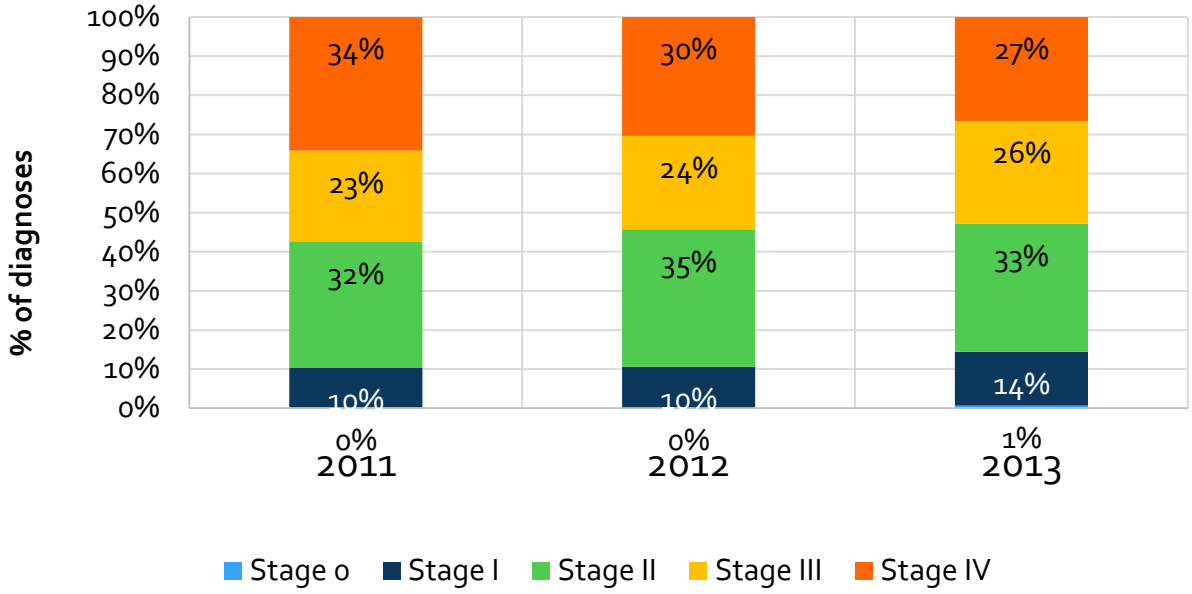
Source: Cancer Registry, Center for Disease Prevention and Control

Figure 16: Percentage of cervical cancer diagnosed at each stage, conditional on stage being known



Source: Cancer Registry, Center for Disease Prevention and Control

Figure 17: Percentage of colorectal cancers diagnosed at each stage conditional on stage being known



Source: Cancer Registry, Center for Disease Prevention and Control

Figure 18: Time elapsed between confirmed breast cancer diagnosis and onset of treatment (radiation, chemo or surgery)

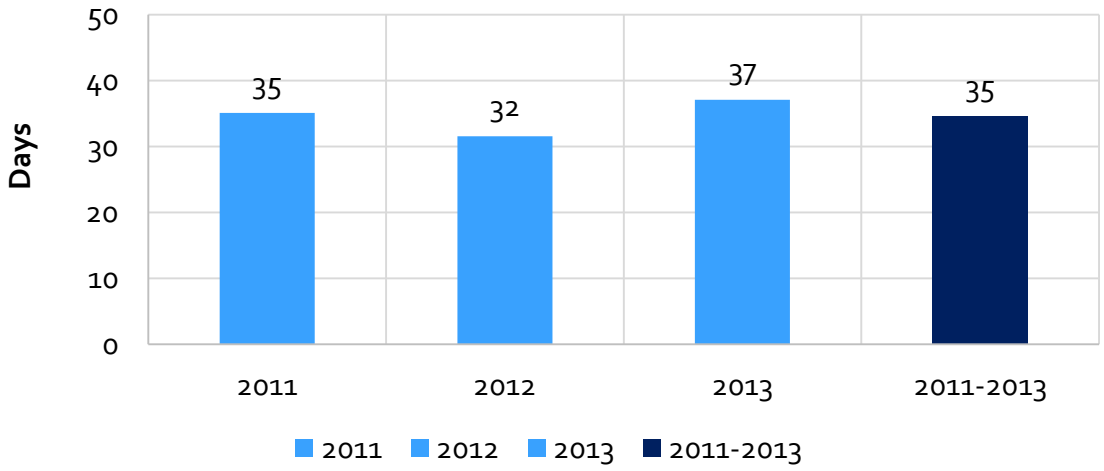


Figure 19: Time elapsed between confirmed cervical cancer diagnosis and onset of treatment (radiation, chemo or surgery)

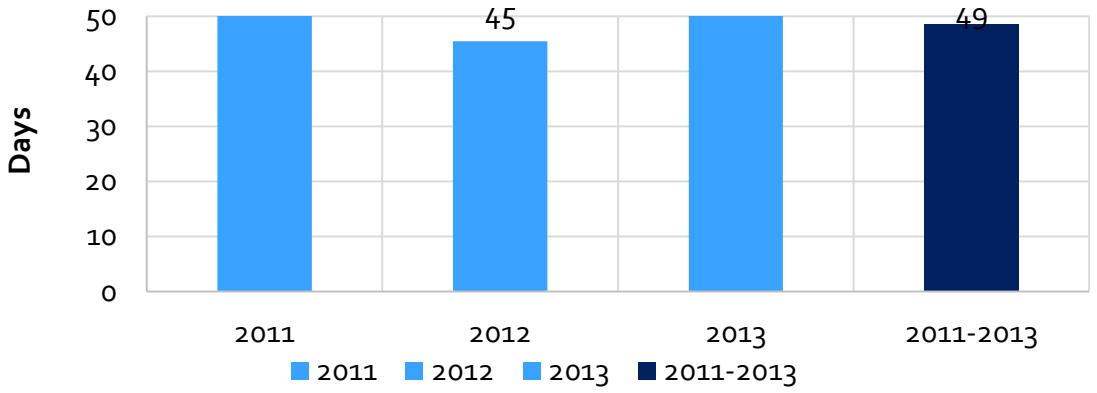


Figure 20: Time elapsed between confirmed colorectal cancer diagnosis and onset of treatment (radiation, chemo or surgery)

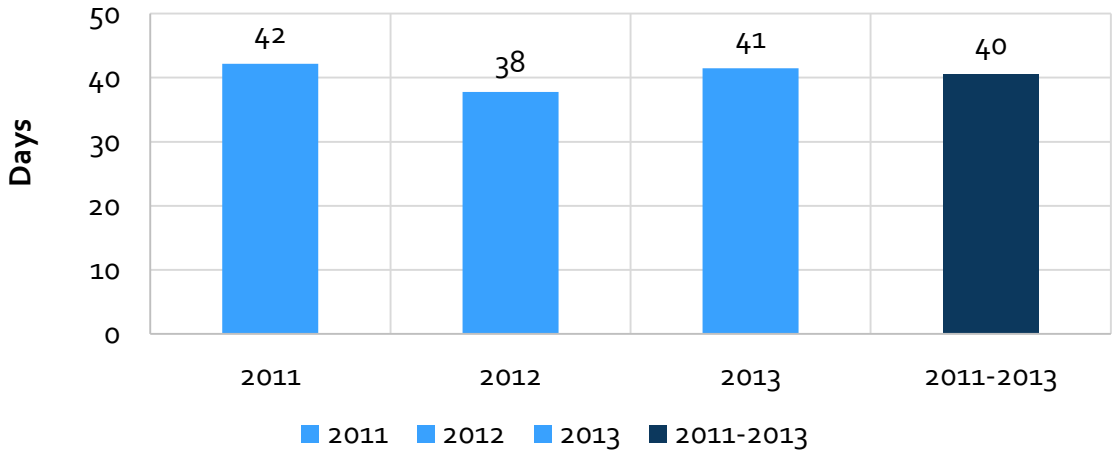
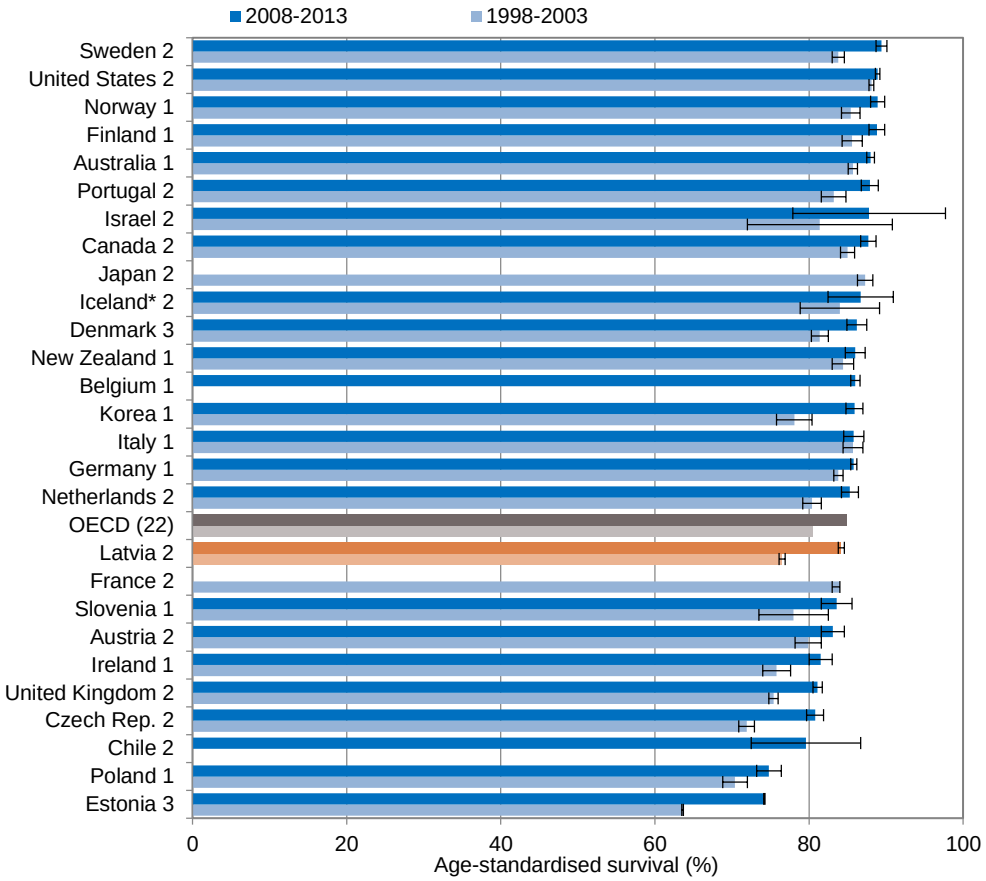
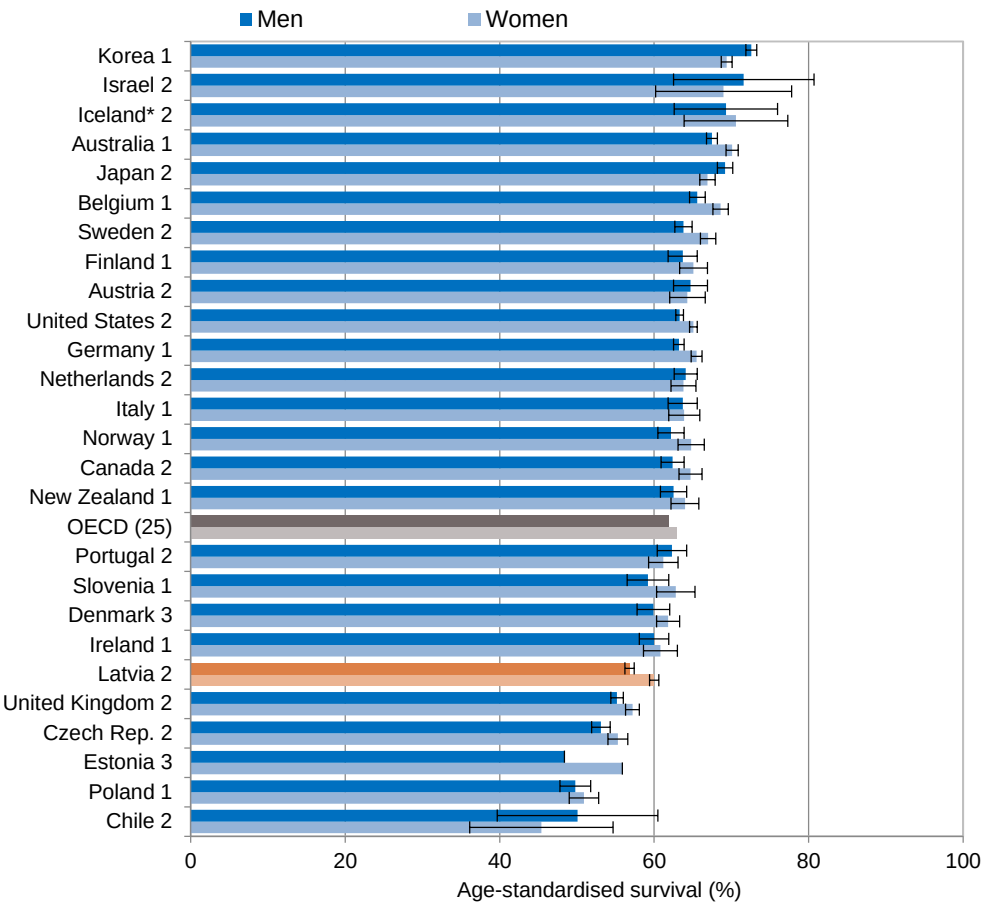


Figure 21: Breast cancer five-year relative survival, 1998-2003 and 2008-2013 (or nearest periods)



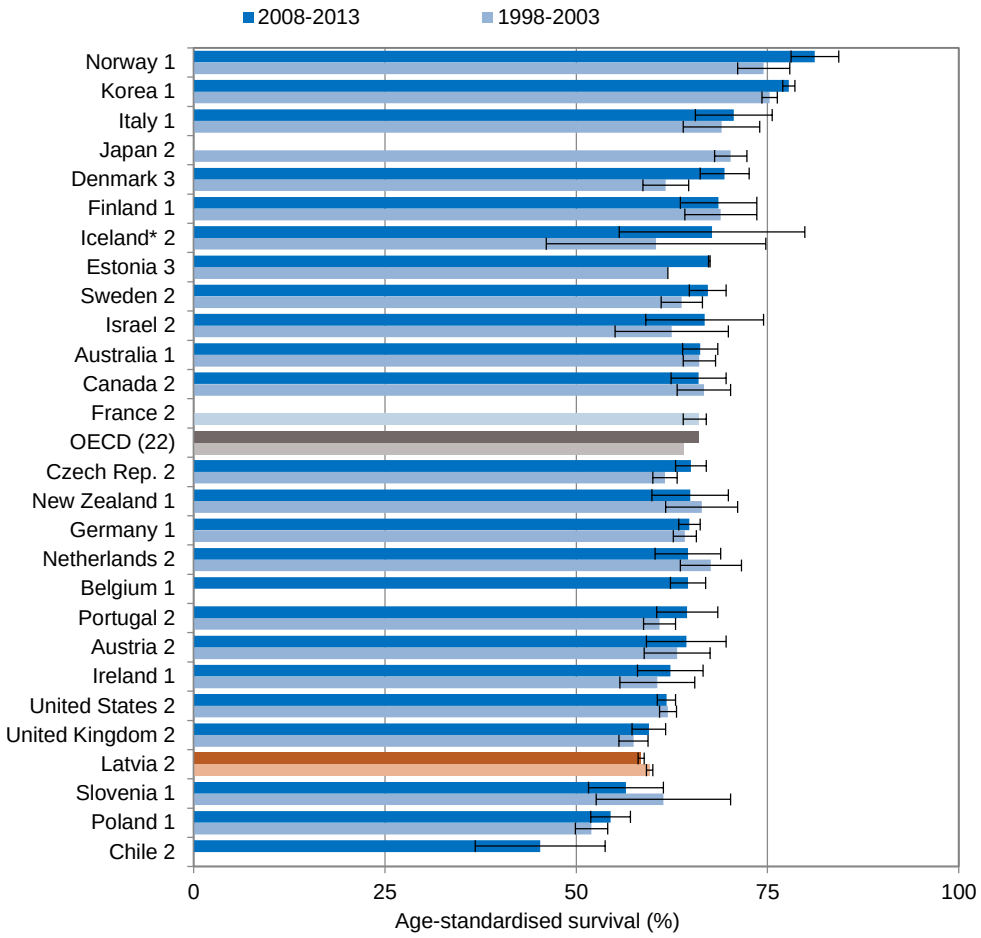
Source: OECD Health Statistics 2015, http://dx.doi.org/10.1787/health-data-en.

Figure 22: Colorectal cancer, five-year relative survival by gender, 2008-2013 (or nearest period)



Source: OECD Health Statistics 2015, http://dx.doi.org/10.1787/health-data-en.

Figure 23: Cervical cancer five-year relative survival, 1998-2003 and 2008-2013 (or nearest periods)



Source: OECD Health Statistics 2015, http://dx.doi.org/10.1787/health-data-en.

Figure 24: Percentage of women sent a mammogram invitation letter who receive a mammogram within 12 months of sending of the letter

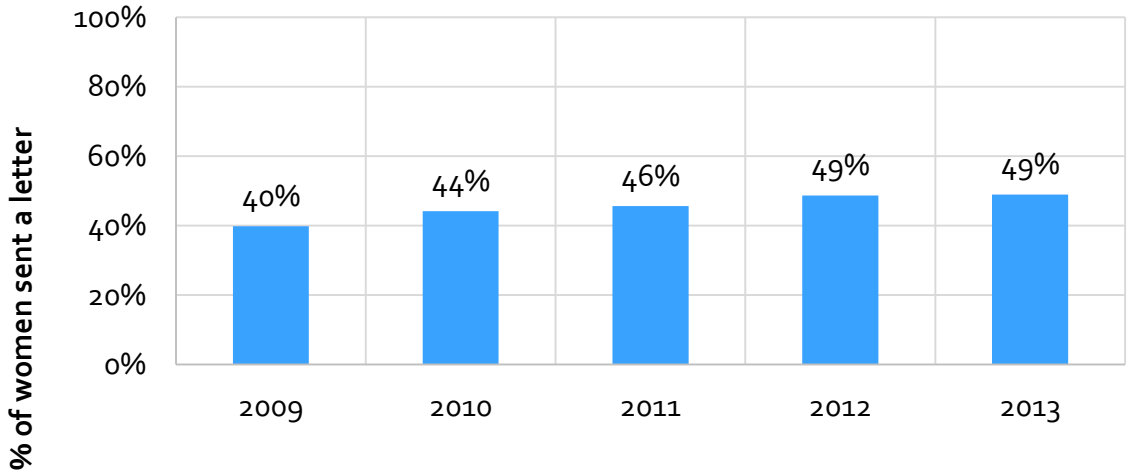
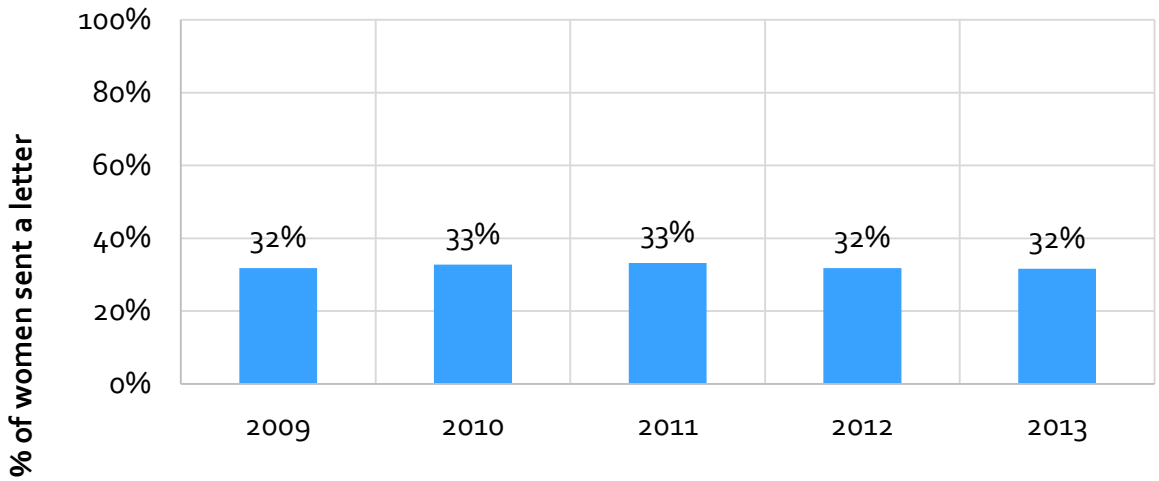


Figure 25: Percentage of women sent an invitation letter who receive a Pap smear within 12 months



MENTAL HEALTH

Tracer conditions: Depression, substance abuse

Summary of empirical findings

 While the benefits package in Latvia does cover a psychological assessment during a wellness visit, as with the other conditions that do not have explicit screening programs, it is difficult to assess performance related to screening without more information about what happened during these visits. There is some information that can be gleaned, however, from examining the location of initial diagnoses. If they predominantly occur outside of the primary care setting, this could be suggestive of weak screening. For patients who had received a depression diagnosis in Latvia during the 2010-2014 period, a majority of them received it in a primary care setting (Figure 26), although a non-trivial fraction are first diagnosed in inpatient or emergency settings. In contrast, only a minority of substance abuse patients are first diagnosed in a primary care setting (Figure 27), although over time initial diagnoses at this level have been increasing.

 Depression is underdiagnosed in Latvia. Less than 1 percent of the population appears in the payment data with a diagnosis of depression in 2011, even though estimates of the incidence of depression range from 3 to 6 percent according to the NICE standard and the WHO Mental Health Surveys that suggest that 1 in 20 people suffer from depression.[8] Depression is also markedly underdiagnosed among patients with cancer and post-partum mothers (Figures 28 and 29). For the latter, not only is the prevalence in this population far below the international benchmark of 10 to 15 percent, but it is also falls below prevalence in the general population.[9] More telling is the finding presented in the accompanying review of the benefits package that a mental health diagnosis does not appear in the top five most frequent diagnoses among individuals committing suicide in the 2009-2014 period.

 Without clinical information, it is not possible to assess whether patients are getting the appropriate levels and combinations of psychotherapy and medication. Current de jure coverage under the benefits package, however, suggests that treatment may fall short, as there is no coverage for psychotherapy for basic depression and reimbursement rates of 50% for antidepressants.

[8] Depression prevalence was measured by taking the total number of unique personal identification numbers with a diagnosis of depression in 2011 in the payment data, disease registries, or death registry (numerator) and dividing this by the total number of people in Latvia in the 2011 Census (denominator).

[9] Robertson, E., Celasun, N., and Stewart, D.E. (2003), "Risk factors for postpartum depression," In Stewart, D.E., Robertson, E., Dennis, C.-L., Grace, S.L., & Wallington, T.(2003). Postpartum depression: Literature review of risk factors and intervention


Follow-up care for patients diagnosed with depression appears adequate. Throughout the year, they make multiple contacts with both GPs and specialists (Figures 30 and 31), although close to 30% of depression patients requiring hospitalization do not see a mental health specialist within 90 days of discharge (Figure 32).

Follow-up care for substance abuse patients, on the other hand, is much weaker. While they still make contact with both GPs and mental health specialists (Figures 33 and 34), a large majority do not receive specialist care within 90 days of discharge (Figure 35).

Recommendations


The current wellness check contains a psychological assessment, but there is no way of currently assessing the extent to which physicians are using this to screen for depression. Moreover, as a large majority of the population does not receive an annual check-up, this service should not serve as the health system's main strategy for detecting depression (according to the NHS payment records, less than one third of women over the age of 20 years had a wellness check in 2014). The Ministry of Health and the National Health Service could encourage greater use of opportunistic screening at the primary care level if electronic health records with decision support were introduced or if the GP performance payments incentivized screening or penalized previously undiagnosed hospital admissions. For high risk patients, such as cancer patients or new mothers, more organized screening would be warranted and could be incorporated into clinical guidelines.


Improved screening should increase diagnosis rates.


The Ministry of Health has little visibility on the quality of care that mental health patients receive in outpatient settings, at least from available data. This is an important knowledge gap, especially as Latvia begins to deinstitutionalize patients currently in long-term facilities and to expand coverage of mental health services in primary and ambulatory specialist settings. To shed light on this issue, the Ministry of Health, together with the Health Inspectorate and the medical faculties, could consider measuring quality of care through provider observations and unannounced standardized patients.


To encourage more frequent and timelier follow-up care among patients hospitalized for depression or substance abuse, the NHS could bundle payments for treatment and follow-up as earlier suggested for AMI and stroke patients.

Main findings

Figure 26: Care setting of initial depression diagnoses

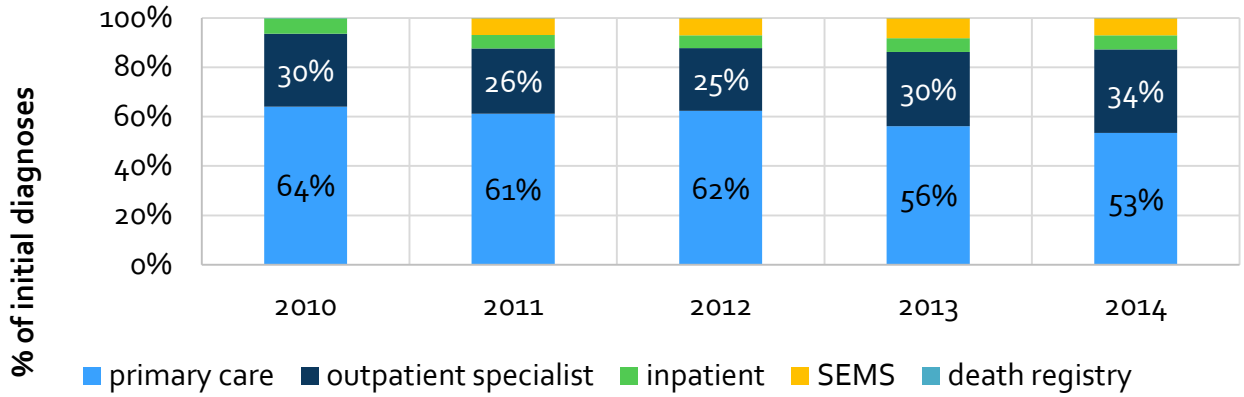


Figure 27: Care setting of initial substance abuse diagnoses

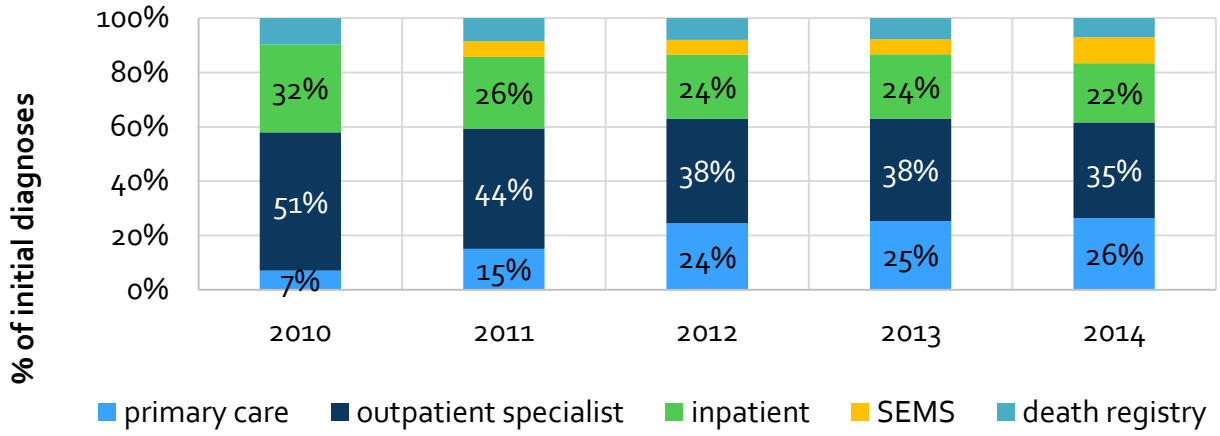


Figure 28: Percentage of patients with active cancer diagnosis who also have a depression diagnosis

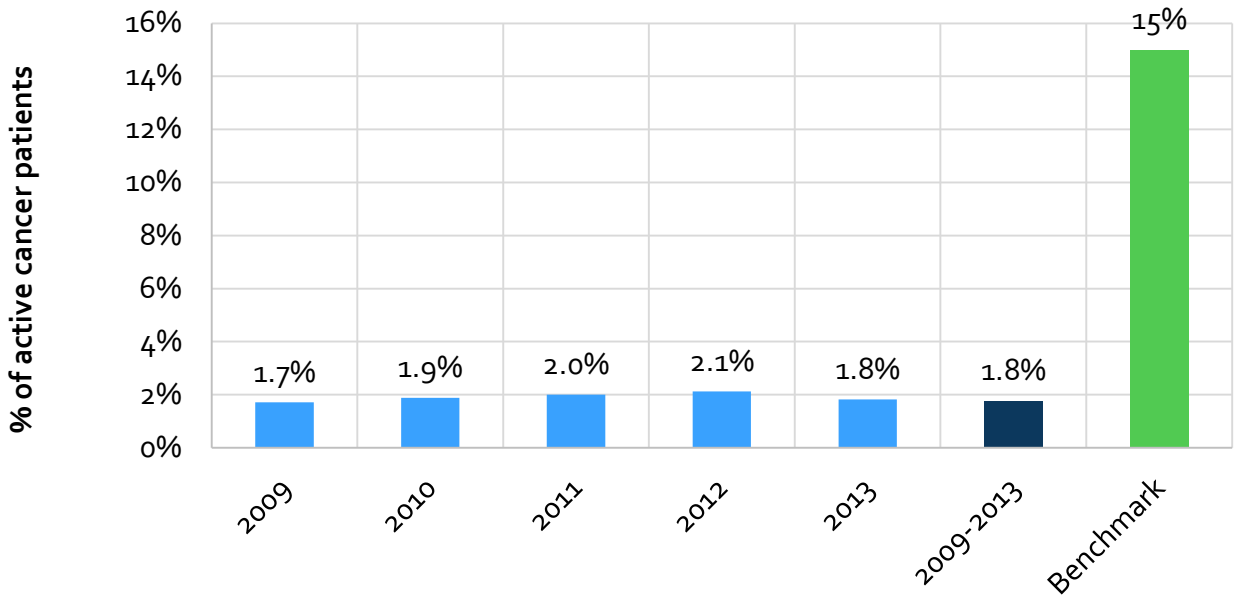


Figure 29: Percentage of postpartum patients who had a depression diagnosis within 12 months after birth

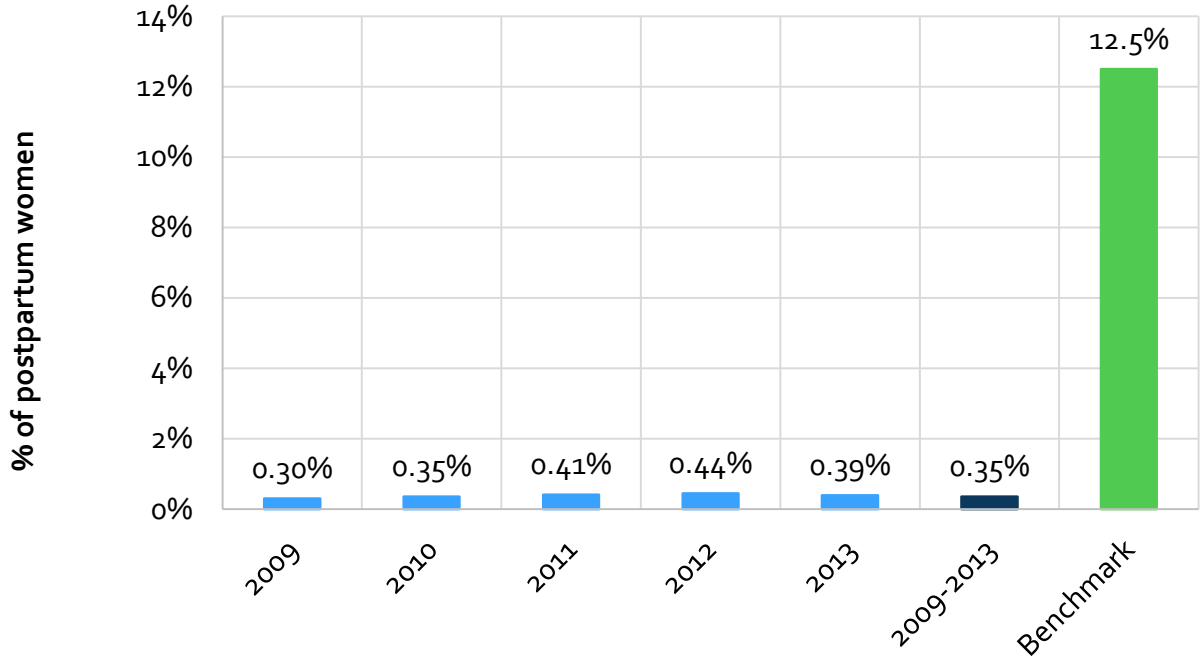


Figure 30: Number of outpatient visits to GP per year for people diagnosed with depression

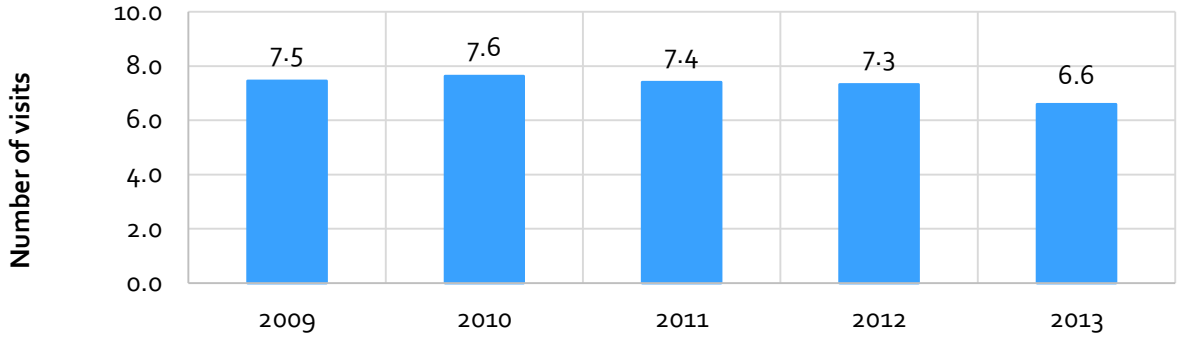


Figure 31: Number of outpatient visits to mental health specialist per year for people diagnosed with depression

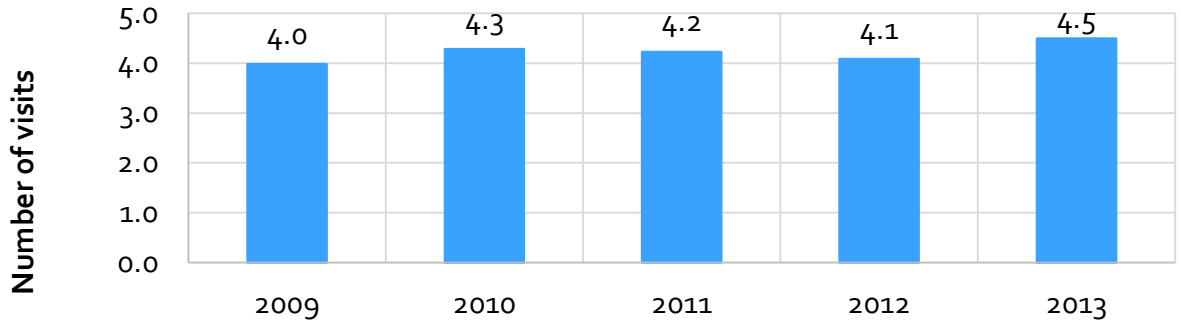


Figure 32: Timing of first follow-up visit with a mental health specialist for inpatient discharges with a depression diagnosis

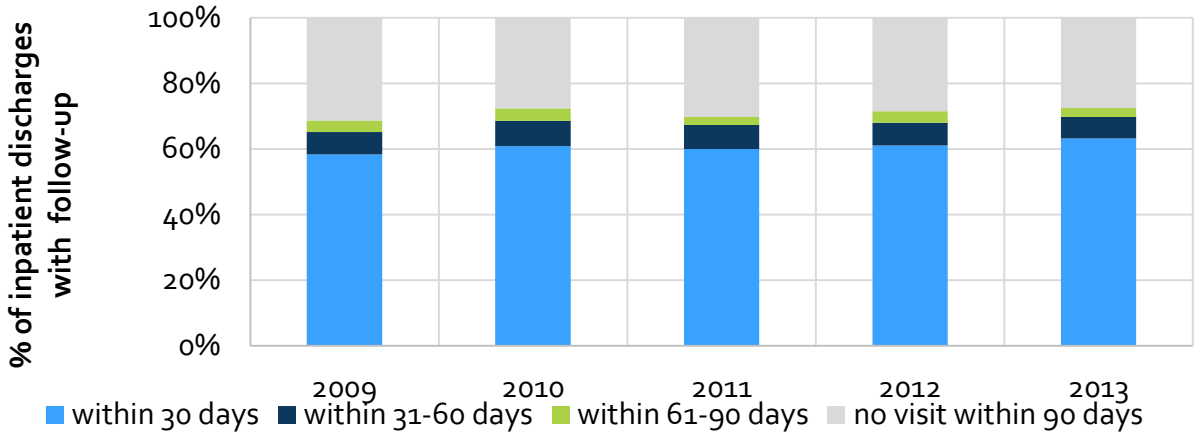


Figure 33: Number of outpatient visits to GP per year for people diagnosed with substance abuse

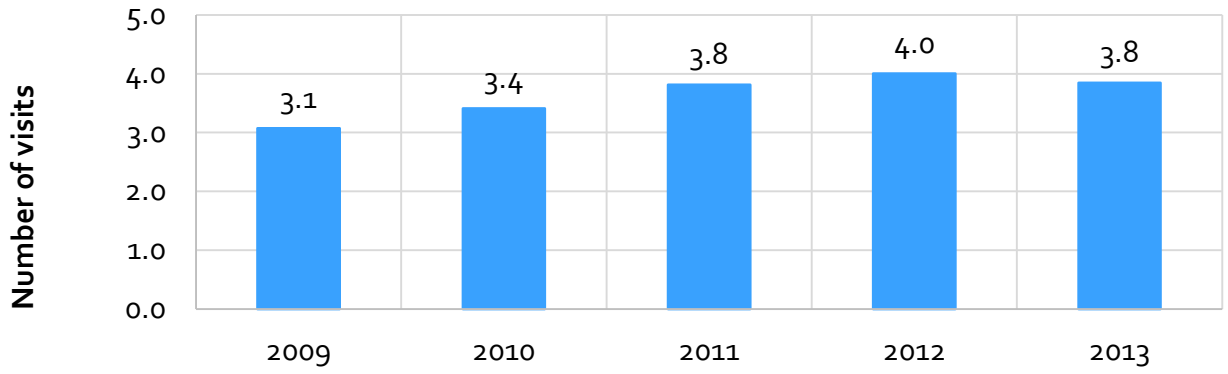


Figure 34: Number of outpatient visits to mental health specialist per year for people diagnosed with substance abuse

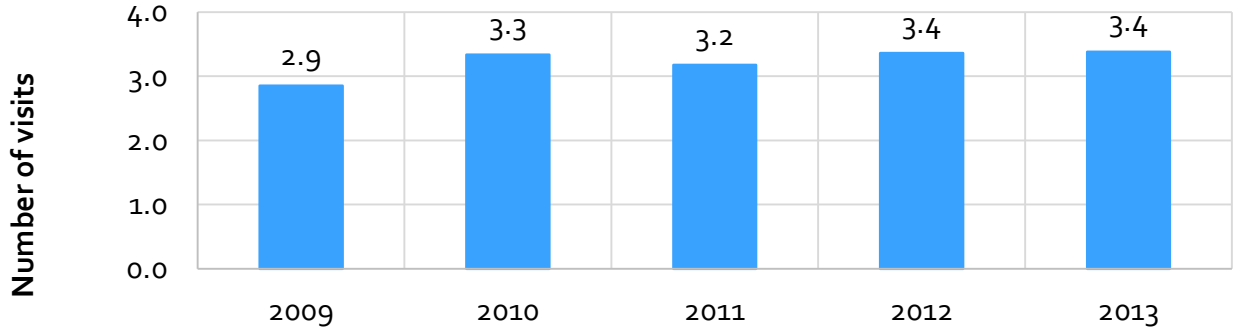
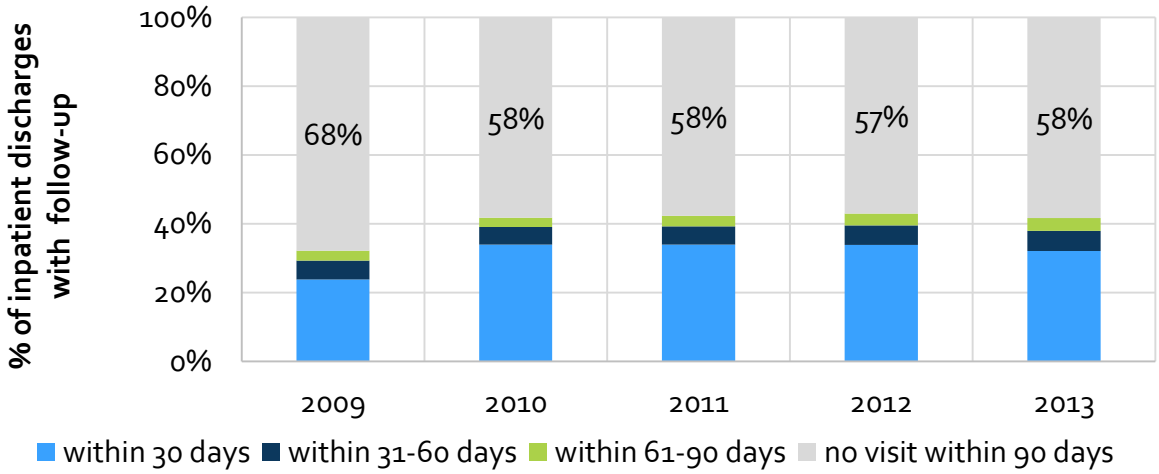


Figure 35: Timing of first follow-up visit to a mental health specialist for inpatient discharges with a substance abuse diagnosis



This section compares the pathways of women who experienced a perinatal death in the 2009-2014 period and women who did not, where perinatal mortality is identified in the Newborn Registry. Given the diverse set of case histories within these groups, it is difficult to assess performance related to treatment and follow-up.

Summary of empirical findings

 During the 2009-2014 period, screening for women who would go on to experience a perinatal death was much less frequent compared to other women whose babies did not die in utero or at birth. They were less likely to start prenatal care on time and they showed lower – sometimes markedly lower – take-up rates for tests that are supposed to occur during the prenatal period, such as genetic screening and blood tests for HIV, tuberculosis, and viral hepatitis (Table 3). They were also more likely to forgo prenatal care completely.

 Despite these differences in screening, the disease profiles of the two groups of women look very similar, according to the "maternal diseases and unfavorable conditions during pregnancy" (Table 4) along with "complications during pregnancy" listed in the Birth Registry.

 It is possible that these conditions that are getting diagnosed are not managed as well among women who go on to experience a perinatal death, as they make fewer prenatal visits overall during their pregnancies. According to the visit data in the NHS payment records, these women make an average of 5.3 prenatal visits, compared to an average of 6.1 visits for women who do not experience a prenatal death. Indeed more direct evidence that some deaths could be prevented with better management comes from an examination of the causes of death and addictions among mothers. The leading cause of perinatal mortality in Latvia is intrauterine hypoxia (Table 5), and while there are many potential causes for this, maternal smoking is one cause that is considered preventable. During the 2009-2014 period, more than 17 percent of mothers experiencing a perinatal death exhibited an addictive behavior, compared to less than 10 percent among mothers who did not have a perinatal death, and smoking accounted for nearly 90 percent of these addictions.

Recommendations

The available evidence suggests room for improvement in prenatal care. While it is worth exploring the extent to which providers can be financially incentivized through their contracts to provide a complete package of prenatal care for their patients, experimenting with patient incentives and outreach could also be options. The women who experienced perinatal deaths in Latvia during the 2009-2014 period came from less advantaged backgrounds than the women who did not, according to the information recorded in the Birth Registry (Only 32% of women with perinatal deaths had progressed beyond secondary education, compared to 45% among women without perinatal deaths). These women may face greater barriers in accessing care, such as lack of transport options or less flexible work arrangements, and they may require targeted assistance.

Main findings

Table 3: Prenatal screening for mothers with and without perinatal deaths, 2009-2014

	Mothers without perinatal death	Mothers with perinatal death
No prenatal care	1.76%	8.74%
Timely prenatal care	92.85%	79.33%
Genetic screening in first trimester	66.00%	58.71%
HIV test	97.36%	87.99%
Tuberculosis test	85.24%	6.71%
Viral hepatitis test	17.51%	4.45%
Number of observations	119,896	1,282

Source: Birth Registry, Center for Disease Prevention and Control. All differences between the two columns are statistically significant at the 5% level.

Table 4: Maternal diseases and unfavorable conditions during pregnancy, 2009-2014

Women with perinatal deaths			Women without perinatal deaths		
	Frequency	Percent		Frequency	Percent
other diseases	189	38.81	other diseases	19,434	46.93
other diseases of genitourinary system	142	29.16	other diseases of genitourinary system	10,797	26.07
other endocrine, nutritional and metabolic	22	4.52	streptococcus, group B	1,866	4.51
other sexually transmitted diseases	18	3.7	other endocrine, nutritional and metabolic	1,719	4.15
gestational diabetes mellitus	18	3.7	other sexually transmitted diseases	1,182	2.85
viral hepatitis	16	3.29	diseases of circulatory system	946	2.28
syphilis in previous anamnesis	13	2.67	gestational diabetes mellitus	930	2.25
diseases of circulatory system	10	2.05	viral hepatitis	910	2.2
adiposity	8	1.64	adiposity	827	2
diabetes mellitus Type 1	7	1.44	renal disorder	568	1.37
HIV	7	1.44	syphilis also in previous anamnesis	546	1.32
chronical hypertension	7	1.44	in vitro fertilization IVF	365	0.88
renal disorder	7	1.44	thyroid dysfunction	357	0.86
in vitro fertilization IVF	6	1.23	HIV	272	0.66
streptococcus, group B	4	0.82	chlamydia	183	0.44
thyroid dysfunction	4	0.82	diabetes mellitus Type 1	142	0.34
chlamydia	3	0.62	chronical hypertension	135	0.33
in vitro fertilization ICSI	3	0.62	congenital malformations of circulatory	107	0.26
gonococcus infection	1	0.21	in vitro fertilization ICSI	59	0.14
diabetes mellitus Type 2	1	0.21	diabetes mellitus Type 2	33	0.08
congenital malformations of circulatory	1	0.21	insemination	19	0.05
			gonococcus infection	18	0.04
Total observations	487	100	Total observations	41,415	100

Table 5: Top ten causes of perinatal death, 2009-2014

	ICD-10 Code	Frequency	Percent
Intrauterine hypoxia before labor	P20.0	429	33.46
Intrauterine hypoxia during labor and delivery	P20.1	90	7.02
Neonatal cerebral ischaemia	P91.0	75	5.85
Sudden Infant Death Syndrome	R95	61	4.76
Multiple congenital malformations, not elsewhere classified	Q89.7	54	4.21
Birth asphyxia, unspecified	P21.9	50	3.9
Condition originating in the perinatal period, unspecified	P96.9	49	3.82
Unspecified intraventricular (nontraumatic) haemorrhage of fetus and newborn	P52.3	43	3.35
Congenital pneumonia, unspecified	P23.9	31	2.42
Bacterial sepsis of newborn, unspecified	P36.9	31	2.42

MONITORING FUTURE BOTTLENECKS

Calculating the indicators in the preceding sections (and the empirical evidence presented in accompanying World Bank reports) has revealed a number of areas for improvement when it comes to data quality. While it should be noted that much of the data used was not intended for analysis but rather for making payments, investing more in data quality will not only improve the ability of the Ministry of Health and the NHS to monitor system bottlenecks in the future. It will also help increase the accuracy and transparency of medical billing.

There were three main data quality issues that made it difficult to track patients' journeys through the health system: accuracy, consistency, and completeness.

Accuracy

Data accuracy refers to the degree to which the data correctly describe the events or conditions they are intending to describe. In the data used for this report and accompanying reports prepared by the World Bank, a lack of accuracy surfaced for many fields:

- *Coding of diagnoses*. Many physicians use ICD-10 codes for conditions with a confirmed diagnosis (for example, C50 for confirmed breast cancer) for patients only suspected of the illness, even though there are corresponding ICD-10 codes for suspected cases that are used by some physicians in Latvia. There are also errors of omission. For example, 21% of inpatients discharged from hospital with a self-harm diagnosis did not also have a mental health and behavioral disorder diagnosis. For the bottleneck analysis, this made it difficult to identify the people who needed to be tracked.

- *Recording of dates*. The NHS and the CDPC have cautioned that dates are recorded with delay. Indeed there are some cancer patients that receive treatment before they appear in the data with a corresponding ICD-10 cancer code. For the bottleneck analysis, this complicates interpreting any calculation related to the time elapsed between two events (for example, diagnosis and treatment) and thus prevents accurate measurement of waiting times. Also, in the health care person's data base with certificates, there are many implausible dates, which makes it challenging to count the number of currently certified physicians in a given specialty.

Consistency

Data consistency refers to a situation in which two or more representations of something have the same value and format either within a database or across databases. In the Latvian data, there was a lack of consistency within databases and across data sources:

- In the reimbursable medicines database (not used in this report), the stated state-reimbursed proportion of the total price of the medicine did not match the same proportion calculated from the stated state contribution and the stated patient contribution. More than 80% of observations were inconsistent in this sense.

- SEMS does not use ICD-10 Codes for all calls but rather its own coding system. It also does not record the patient IDs of patients receiving services from its cadre of specialists. This makes it difficult to track patients across emergency services and services paid through NHS contracts.

- For some cancers and some years, a non-trivial fraction (up to 15%) of patients who received cancer treatment in the NHS payment data never appeared in the CDPC Cancer Registry.

- The diabetes registry of the CDPC contained only 52% of people diagnosed with diabetes between 2009 and 2014 in the NHS payment data.

Completeness

Data completeness refers to a situation in which there are no blank values for fields that should not be blank. In the reimbursable medicines database, the coding of medication is highly incomplete and non-standardized. Pharmacy IT systems do not seem to include standard codes and names for medications, and information appears to be entered manually by pharmacists. This makes it very difficult to check drug adherence for the restricted set of patients that do pick up prescriptions, as it would involve performing string searches for multiple potential variants of a single drug's name.

Missing information

Related to completeness is information that is just missing. In Latvia, the timing of some important events is not currently recorded in the NHS payment data – in particular, the dates on which physicians make a referral for a consultation or diagnostic test and the dates on which they prescribe a medication. Currently, these dates appear in the NHS database only if patients do seek care from the referred physician, do receive the referred diagnostic exam, or do pick up their prescriptions. Without recording these dates for all patients, it is not possible to distinguish a situation in which a physician neglects to make a referral or prescribe a medication from a situation in which the patient simply fails to follow through on a referral or prescription. More importantly, it will not be possible to accurately measure waiting times for certain specialties and diagnostic exams. Currently waiting times are self-reported to the NHS by health care providers.

The lack of data on privately financed care is also problematic. Without this information, it will not be possible to tell whether providers completely exhaust their quotas before charging patients or whether they engage in price discrimination in order to maximize profits. It will also be impossible to completely trace patients throughout the health system and accurately measure the extent to which they need to

rely on private services to meet their essential healthcare needs. Data on privately financed services will also help the NHS both balance cost containment measures like quotas with more information on population needs and more accurately predict the extent to which performance incentives contribute to a provider's total earnings.

Recommendations

Many, if not most, of these data issues stem from the absence of a real-time information system and limited knowledge of disease coding, and investment in an Electronic Health Record (EHR) could be a potential solution.

The current post-entry/upload system is highly vulnerable to manipulation of dates, especially in a quota environment. It is also burdensome for both physicians and patients as data entry likely takes considerable time away from patient care.

An EHR, on the other hand, would automatically record dates and other information relevant for payments, in addition to clinical information that could be used in clinical audits and other assessments of quality of care.

An EHR could also be vehicle for encouraging take-up of other reforms suggested in accompanying World Bank reports, such as clinical guidelines and clinical pathways, as some elements of decision-support could be incorporated into the interface. The EHR could also contribute more metrics that could be used for augmenting performance-based payments. Moreover, having an EHR serve a complete medical record for every patient would be a natural way to collect comparable information on privately financed care.

Implementing an EHR in Latvia will require considerable training of all healthcare providers, which will also provide an opportunity to offer guidelines and training for disease and procedure coding. The clinical information of the EHR could provide sufficient information to carry out basic checks on the usage of coding, which could be immediately incorporated as feedback to providers.

The EHR would not solve all of the data issues flagged above. Independently, the pharmaceutical dispensing and payment data system needs to be updated. Options for the description of medication and reimbursement rates would ideally be standardized and pre-coded.

APPENDIX 1: DIRECTORY OF INDICATORS

CARDIOVASCULAR CONDITIONS

Status	**DONE**
Indicator Nr	**CVD5**
Indicator	**Percentage of hypertension patients with annual serum renal function and albuminuria tests performed**
Tracer	Hypertension
Numerator or calculation	Among people in the denominator: Number of people who had urine test for microalbuminaria within 365 days of the first appearance of diagnosis of hypertension in year t.
Denominator or set of people for whom to calculate	Number of people with a diagnosis of hypertension in year t, as per any NHS or SEMS database.
Source of data 1	Numerator: NHS outpatient manipulation data.
Source of data 2	Denominator: NHS inpatient and outpatient databases. SEMS database
Diagnosis and manipulation codes	Microalbuminaria: 41101
Outstanding issues	
Notes	Compute for 2009-2013. The denominator excludes cases where the initial diagnosis in year t appeared through the death registry.
References	

Status	**DONE**
Indicator Nr	**CVD6**
Indicator	**Percentage of hypertension patients with annual (random) blood glucose tests**
Tracer	Hypertension
Numerator or calculation	Among people in the denominator: Number of people who had blood glucose test within 365 days of the first appearance of diagnosis of hypertension in year t.
Denominator or set of people for whom to calculate	Number of people with a diagnosis of hypertension in year t, as per any NHS or SEMS database.
Source of data 1	Numerator: NHS outpatient manipulation data.
Source of data 2	Denominator: NHS inpatient and outpatient databases. SEMS database
Diagnosis and manipulation codes	Blood glucose tests: 41095 41096 41102 Also incude HgA1C because of potential co-morbidity: 41103 41104 41105 41097
Outstanding issues	
Notes	Compute for 2009-2013. The denominator excludes cases where the initial diagnosis in year t appeared through the death registry.
References	

Status	DONE
Indicator Nr	**CVD7**
Indicator	**Percentage of hypertension patients with annual creatinine tests**
Tracer	Hypertension
Numerator or calculation	Among people in the denominator: Number of people who had creatinine test within 365 days of the first appearance of diagnosis of hypertension in year t.
Denominator or set of people for whom to calculate	Number of people with a diagnosis of hypertension in year t, as per any NHS or SEMS database.
Source of data 1	Numerator: NHS outpatient manipulation data.
Source of data 2	Denominator: NHS inpatient and outpatient databases. SEMS database
Diagnosis and manipulation codes	Creatinine: 41006
Outstanding issues	
Notes	Compute for 2009-2013. The denominator excludes cases where the initial diagnosis in year t appeared through the death registry.
References	

Status	DONE
Indicator Nr	**CVD87**
Indicator	**# of GP visits per year, conditional on hypertension diagnosis**
Tracer	Hypertension
Numerator or calculation	For people in the denominator: Number of visits to a GP within 365 days of the first diagnosis of hypertension in year t
Denominator or set of people for whom to calculate	Number of people with a diagnosis of hypertension in year t, as per any NHS or SEMS database.
Source of data 1	Visits to GPs: NHS outpatient payment data and specialist certificate database
Source of data 2	Denominator: NHS inpatient and outpatient databases. SEMS database
Diagnosis and manipulation codes	See diagnosis codes in the diagnosis codes sheet
Outstanding issues	
Notes	Compute for 2009-2013. The denominator excludes cases where the initial diagnosis in year t appeared through the death registry. Uses the more narrow primary care physician approach (PCP specialist only), not the broader approach (PCP specialists plus non
References	

Status	DONE
Indicator Nr	**CVD87**
Indicator	**# of GP visits per year, conditional on hypertension diagnosis**
Tracer	Hypertension
Numerator or calculation	For people in the denominator: Number of visits to a GP within 365 days of the first diagnosis of hypertension in year t
Denominator or set of	Number of people with a diagnosis of hypertension in year t, as per any NHS or

people for whom to calculate	SEMS database.
Source of data 1	Visits to GPs: NHS outpatient payment data and specialist certificate database
Source of data 2	Denominator: NHS inpatient and outpatient databases. SEMS database
Diagnosis and manipulation codes	See diagnosis codes in the diagnosis codes sheet
Outstanding issues	
Notes	Compute for 2009-2013. The denominator excludes cases where the initial diagnosis in year t appeared through the death registry. Uses the more narrow primary care physician approach (PCP specialist only), not the broader approach (PCP specialists plus non
References	

Status	**DONE**
Indicator Nr	**CVD88**
Indicator	**# of outpatient visits to cardio specialists, conditional on hypertension diagnosis**
Tracer	Hypertension
Numerator or calculation	For people in the denominator: Number of outpatient visits to a cardio specialist within 365 days of the first diagnosis of hypertension in year t
Denominator or set of people for whom to calculate	Number of people with a diagnosis of hypertension in year t, as per any NHS or SEMS database.
Source of data 1	Visits to cardio specialists: NHS outpatient payment data and specialist certificate database
Source of data 2	Denominator: NHS inpatient and outpatient databases. SEMS database
Diagnosis and manipulation codes	See diagnosis codes in the diagnosis codes sheet
Outstanding issues	
Notes	Compute for 2009-2013. The denominator excludes cases where the initial diagnosis in year t appeared through the death registry.
References	

Status	**DONE**
Indicator Nr	**CVD18a_total, CVD18b_LDL, CVD18c_HDL**
Indicator	**Cholesterol (total & fraction) tests performed annually for diabetes patients**
Tracer	Diabetes
Numerator or calculation	Among people in the denominator: Number of people who had total and fraction cholesterol tests within 365 days of the first appearance of diagnosis of diabetes in year t.
Denominator or set of people for whom to calculate	Number of people with a diagnosis of diabetes in year t, as per any NHS or SEMS database.
Source of data 1	Numerator: NHS outpatient manipulation data.
Source of data 2	Denominator: NHS inpatient and outpatient databases. SEMS database
Diagnosis and	Total: 41056 41057 41045

manipulation codes	LDL:41058 41059 41060 41055 HDL: 41047 41054
Outstanding issues	
Notes	Compute for 2009-2013. The denominator excludes cases where the initial diagnosis in year t appeared through the death registry.
References	

Status	**DONE**
Indicator Nr	**CVD19**
Indicator	**Percentage of diabetes patients with annual serum renal function and albuminuria tests performed**
Tracer	Diabetes
Numerator or calculation	Among people in the denominator: Number of people who had urine test for microalbuminaria within 365 days of the first appearance of diagnosis of diabetes in year t.
Denominator or set of people for whom to calculate	Number of people with a diagnosis of diabetes in year t, as per any NHS or SEMS database.
Source of data 1	Numerator: NHS outpatient manipulation data.
Source of data 2	Denominator: NHS inpatient and outpatient databases. SEMS database
Diagnosis and manipulation codes	Microalbuminaria: 41101
Outstanding issues	
Notes	Compute for 2009-2013. The denominator excludes cases where the initial diagnosis in year t appeared through the death registry.
References	

Status	**DONE**
Indicator Nr	**CVD20**
Indicator	**Percentage of diabetes patients with an annual HgA1c tests performed**
Tracer	Diabetes
Numerator or calculation	Among people in the denominator: Number of people who had HgAIc test within 365 days of the first appearance of diagnosis of diabetes in year t.
Denominator or set of people for whom to calculate	Number of people with a diagnosis of diabetes in year t, as per any NHS or SEMS database.
Source of data 1	Numerator: NHS outpatient manipulation data.
Source of data 2	Denominator: NHS inpatient and outpatient databases. SEMS database
Diagnosis and manipulation codes	HgA1C: 41103 41104 41105 41097
Outstanding issues	
Notes	Compute for 2009-2013. The denominator excludes cases where the initial diagnosis in year t appeared through the death registry.

References	

Status	**DONE**
Indicator Nr	**CVD21**
Indicator	**Percentage of diabetes patients with annual creatinine tests**
Tracer	Diabetes
Numerator or calculation	Among people in the denominator: Number of people who had creatinine test within 365 days of the first appearance of diagnosis of diabetes in year t.
Denominator or set of people for whom to calculate	Number of people with a diagnosis of diabetes in year t, as per any NHS or SEMS database.
Source of data 1	Numerator: NHS outpatient manipulation data.
Source of data 2	Denominator: NHS inpatient and outpatient databases. SEMS database
Diagnosis and manipulation codes	Creatinine: 41006
Outstanding issues	
Notes	Compute for 2009-2013. The denominator excludes cases where the initial diagnosis in year t appeared through the death registry.
References	

Status	**DONE**
Indicator Nr	**CVD89**
Indicator	**# of GP visits per year, conditional on diabetes diagnosis**
Tracer	Diabetes
Numerator or calculation	Among people in the denominator: Number of visits to a GP within 365 days of the first diagnosis of diabetes in year t
Denominator or set of people for whom to calculate	Number of people with a diagnosis of diabetes in year t, as per any NHS or SEMS database.
Source of data 1	Visits to GPs: NHS outpatient payment data and specialist certificate database
Source of data 2	Denominator: NHS inpatient and outpatient databases. SEMS database
Diagnosis and manipulation codes	See diagnosis codes in the diagnosis codes sheet
Outstanding issues	
Notes	Compute for 2009-2013. The denominator excludes cases where the initial diagnosis in year t appeared through the death registry. Uses the more narrow primary care physician approach (PCP specialist only), not the broader approach (PCP specialists plus non
References	

Status	**DONE**
Indicator Nr	**CVD90**
Indicator	**# of outpatient visits to endocrinology specialists, conditional on diabetes diagnosis**

Tracer	Diabetes
Numerator or calculation	For people in the denominator: (Sum of) Number of outpatient visits to an endocrinology specialist within 365 dayshs of the first diagnosis of depression in year t
Denominator or set of people for whom to calculate	Number of people with a diagnosis of diabetes in year t, as per any NHS or SEMS database.
Source of data 1	Visits to endocrinology specialists: NHS outpatient payment data and specialist certificate database
Source of data 2	Denominator: NHS inpatient and outpatient databases. SEMS database
Diagnosis and manipulation codes	See diagnosis codes in the diagnosis codes sheet
Outstanding issues	
Notes	Compute for 2009-2013. The denominator excludes cases where the initial diagnosis in year t appeared through the death registry.
References	

Status	**DONE**
Indicator Nr	**CVD31a, CVD31b, CVD31c**
Indicator	**Timing of first follow-up visit with a cardiologist for inpatient discharges with a CAD diagnosis (within 30 days, within 31- 60, within 61-90 days, none within 90 days)**
Tracer	CAD/ AMI/ CHF (separately)
Numerator or calculation	For the inpatient discharges in the denominator: (Sum of) Dummy for whether the person discharged had a first follw-up visit with a cardiologist within 30/31-60/61-90 days of the discharge
Denominator or set of people for whom to calculate	Number of live hospital discharges for which the discharge diagnostic codes include a CAD/AMI/CHF code.
Source of data 1	Follow-up visits: NHS outpatient data; Specialties: specialty certificate database
Source of data 2	Inpatient discharges: Inpatient movement data
Diagnosis and manipulation codes	See diagnosis codes in the diagnosis codes sheet
Outstanding issues	Only included cardiologist to be in line with the mental health indicator - ?Should we add GP visits to the indicator or not? Computed the indicator for CAD/AMI/CHF separately - should this be lumped together?
Notes	Cross check results against previous calculations from Center for Health Economics, to ensure consistency.
References	

Status	**DONE**
Indicator Nr	**CVD37**
Indicator	**Timing of first follow-up visit with a neurologist for inpatient discharges with a stroke diagnosis (within 30 days, within 31- 60, within 61-90 days, none within 90 days)**

Tracer	Stroke (Hemorrhagic and ischemic)
Numerator or calculation	For the inpatient discharges in the denominator: (Sum of) Dummy for whether the person discharged had a first visit with a neurologist within 30/31-60/61-90 days of the discharge
Denominator or set of people for whom to calculate	Number of live hospital discharges for which the discharge diagnostic codes include a stroke code.
Source of data 1	Follow-up visits: NHS outpatient data; Specialties: specialty certificate database
Source of data 2	Inpatient discharges: Inpatient movement data
Diagnosis and manipulation codes	See diagnosis codes in the diagnosis codes sheet
Outstanding issues	Only included neurologist to be in line with the mental health indicator - ?Should we add GP visits to the indicator or not?
Notes	Model on M27 ? Only include ischemic stroke or also include hemorrhagic stroke
References	

CANCERS

Status	**DONE**
Indicator Nr	**C02**
Indicator	**% of women aged 50-69 receiving 2 -yearly screening mammograms,**
Tracer	Breast cancer
Numerator or calculation	Number of women age 51 to 69 in year t who had a mammogram in t or t-1
Denominator or set of people for whom to calculate	Total women aged 51-69 in year t
Source of data 1	NHS outpatient databases: manipulation database.
Source of data 2	Women database
Diagnosis and manipulation codes	Manipulation codes: Mammography in other diagnostics
Outstanding issues	
Notes	Compute for 2010-2014. Denominator includes only alive women at the time of the indicator is computed. If the women died the previous year, it does not count in the denominator. If the women died during the year of the manipulation/diagnosis, it does count for the denominator. We merged the women list into the manipulations database (to look for the relevant manipulation codes) OECD uses country specific guidelines in order to calculate this indicator. The data available excludes privately financed mammograms (private facilities or over-quota situations).
References	http://www.oecd-ilibrary.org/docserver/download/8112121ec047.pdf?expires=1460136579&id=id&accname=guest&checksum=EA4C867E103BC33C7BB2ABAB858842FE definition used by OECD is based on the definition used in each country. According to OECD report for 2000-2010 in Latvia is 0.417 using survey data. See Graph 4.8.1

Status	**DONE**
Indicator Nr	**C03**
Indicator	**% of women sent a mammogram invitation letters in year t, who receive a mammogram within 12 months from sending of the letter.**
Tracer	Breast cancer
Numerator or calculation	Women sent a breast cancer invitation letter on date d in year t and receive a mammogram by d+12 months
Denominator or set of people for whom to calculate	Women sent a breast cancer invitation letter in year t
Source of data 1	NHS outpatient manipulation database: mammogram codes NHS outpatient record database: start date of the outpatient record
Source of data 2	
Diagnosis and manipulation codes	Manipulation codes: Mammography in other diagnostics
Outstanding issues	
Notes	Compute for 2009-2013

	We merged the list of (PID/year) from invitation database into the outpatient manipulation database. we merged it into the records database (using opr_id) to extract the start date of the outpatient episode. We compared dates of sending letters and start date of the outpatient record. The data available excludes privately financed mammograms (private facilities or over-quota situations).
References	

Status	**DONE**
Indicator Nr	**C05**
Indicator	**Percentage of breast cancers diagnosed at Stage s= 0, I, II, III, IV, Unknown, Unavailable separately by year for 2011, 2012, 2013**
Tracer	Breast cancer
Numerator or calculation	Breast cancer cases diagnosed in year t at stage s or unkonwn or unavailable
Denominator or set of people for whom to calculate	Persons with first diagnosis of breast cancer in year t, conditional on not having the same code in the previous 24 months
Source of data 1	Staging : Cancer registry.
Source of data 2	People : Constructed database on patients with dates of diagnosis and source of data.
Diagnosis and manipulation codes	Diagnosis: breastcancer confirmed
Outstanding issues	
Notes	Compute for 2011-2013. Years 2009 and 2010 are missing because we need 24 month lead to initial diagnosis . We excluded diagnoses made through the death registry. Around 70% of patients with first diagnosis of breast cancer (confirmed) in year t were not found in cancer registry in year t. Date of diagnosis in cancer registry is not precise. Also, it is not clear if date in cancer registry refers to first date of diagnosis. Note that in year 2014 numbers of observations in the cancer registry dramatically declined since August onwards. We merged datasets (by PID and by year of diagnosis). If person with diagnosis is not in cancer registry, we set staging to "unavailable". Note that in order to merge stages of cancer from cancer registry with list of people first diagnosis with cancer (in a given year) we used year of diagnosis and PID variables. Whitin a given year, the same patient could have more than one stage. We considered only the first stage occurred in that year.
References	Benchmark countries (stage I): Canada (43.9%) Denmark (30.1%) Norway (44.5%) Sweden (45.2%) Source: http://www.nature.com/bjc/journal/v108/n5/full/bjc20136a.html

Status	DONE
Indicator Nr	**C08**
Indicator	**% of diagnosed patients with at least one outpatient visit with a cancer specialist within 30/60/90/365 days or no visits within a year after diagnosis, separately by year**
Tracer	Breast cancer
Numerator or calculation	Within the denominator, people with outpatient visit with a cancer specialist within 30/60/90/365 days of the initial diagnosis date or without any visits a year of the initial diagnosis date.
Denominator or set of people for whom to calculate	People with first occurence of diagnosis code of cancer (confirmed) in year t, conditional on not having the same code in the previous 24 months.
Source of data 1	Constructed database on patients with dates of diagnosis and source of data.
Source of data 2	Outpatient record data for cancer patients, specialist list for breast cancer
Diagnosis and manipulation codes	Diagnosis: breastcancer confirmed
Outstanding issues	
Notes	Compute for 2011-2013 as denominator is conditional on not having the same diagnosis 24 months ago, and numerator looks for visits within 365 days. Categories of the indicator should add up to 100%. This indicator is calculated in outpatient visits settings only.
References	

Status	DONE
Indicator Nr	**C09**
Indicator	**Time elapsed (in days) between diagnosis (confirmed) and onset of treatment (radiation onc., chemo, surgery), separately by year.**
Tracer	Breast cancer
Numerator or calculation	Onset of treatment: Start date of first inpatient or outpatient record that includes a manipulation code for treatment Date of diagnosis: first occurrence of diagnosis code of breast canacer in year t, conditional on not having the same code in the previo
Denominator or set of people for whom to calculate	People with first occurence of diagnosis code of breast cancer confirmed in year t, conditional on not having the same code in the previous 24 months, conditional on not having the diagnosis date coincide with date of inpatient or outpatient record with
Source of data 1	Constructed database on patients with dates of diagnosis and source of data.
Source of data 2	Outpatient record data for breast cancer confirmed patients, outpatient manipulation data Inpatient record data for breast cancer confirmed patients, inpatient manipulation data
Diagnosis and manipulation codes	Manipulation codes: under treatment codes for radiation therapy, cancer chemo procedure, breast cancer chemo, needle ablation of tumor, partial mastectomy, radical mastectomy. Diagnosis: breastcancer confirmed
Outstanding issues	
Notes	Compute for 2011-2013. Observations with diagnosis date that coincide with date of inpatient or outpatient

	record with a treatment manipulation were excluded in order to compute the indicator. We considered only treatments within a year of diagnosis date and excluded any observation with treatment date before diagnosis date. The indicator is calculated on the group of people with first occurence of diagnosis code of breast cancer confirmed in year t, conditional on not having the same code in the previous 24 months conditional on receiving treatment. Only around 40% of these type of patients received treatment (see indicator 09_1)
References	

Status	**DONE**
Indicator Nr	**C15**
Indicator	**% of women age 25-70 screened for cervical cancer every 3 years, separately by year**
Tracer	Cervical cancer
Numerator or calculation	Women aged 27-70 in year t who had a Pap smear in year t, t-1, or t-2
Denominator or set of people for whom to calculate	Women aged 27-70 in year t
Source of data 1	NHS outpatient databases: manipulation database.
Source of data 2	Women database
Diagnosis and manipulation codes	Manipulation codesfor cytological Examination of the Cervical Canal (Pap smear), Pap smear by a OB/GYN, family doctor, midwife, Physician assistance.
Outstanding issues	
Notes	Compute for 2011-2014.
References	

Status	**DONE**
Indicator Nr	**C16**
Indicator	**% of women sent invitation letters who receive a Pap smear within 12 months, separately by year.**
Tracer	Cervical cancer
Numerator or calculation	Women who receive cervical cancer invitation letter on date d in year t and receive a pap smear by d+12 months
Denominator or set of people for whom to calculate	Women who receive cervical cancer screening invitation letter in year t
Source of data 1	NHS Payment Data
Source of data 2	Database on Invitation letters for screening
Diagnosis and manipulation codes	Manipulation codesfor cytological Examination of the Cervical Canal (Pap smear), Pap smear by a OB/GYN, family doctor, midwife, Physician assistance.
Outstanding issues	
Notes	Compute for 2009-2013. We used the ICD-10 code C53 for cervical cancer and we nclude all sub-codes, C53.0- If percentage of pap smears in outpatient private setting is high, the indicator is

	not reliable.
References	

Status	**DONE**
Indicator Nr	**C18**
Indicator	**Percentage of cervical cancers diagnosed at Stage s= 0, I, II, III, IV, Unknown, Unavailable separately by year.**
Tracer	Cervical cancer
Numerator or calculation	Cervical cancer cases diagnosed in year t at stage s or unkonwn or unavailable
Denominator or set of people for whom to calculate	Persons with first diagnosis of this cancer at stage s in year t, conditional on not having the same code in the previous 24 months.
Source of data 1	Staging : Cancer registry.
Source of data 2	People: Constructed database on patients with dates of diagnosis and source of data.
Diagnosis and manipulation codes	Diagnosis: cervical cancer confirmed
Outstanding issues	Over 60% of patients with first diagnosis of cervical cancer (confirmed) in year t were not found in cancer registry in year t. Date of diagnosis in cancer registry is not precise. It is not clear if date in cancer registry refers to first date of diag
Notes	Compute for 2011-2013. Years 2009 and 2010 are missing because we need 24 month lead to initial diagnosis . We excluded diagnoses made through the death registry Categories of the indicator should add up to 100%. We merged datasets (by PID and by year of diagnosis). If person with diagnosis is not in cancer registry, we set staging to "unavailable". Note that in order to merge stages of cancer from cancer registry with list of people first diagnosis with cancer (in a given year) we used year of diagnosis and PID variables. Whitin a given year, the same patient could have more than one stage. We considered only the first stage occurred in that year.
References	

Status	**DONE**
Indicator Nr	**C22**
Indicator	**Time elapsed (in days) between diagnosis (confirmed) and onset of treatment (radiation onc., chemo, surgery), separately by year.**
Tracer	Cervical cancer
Numerator or calculation	Onset of treatment: Start date of first inpatient or outpatient record that includes a manipulation code for treatment Date of diagnosis: first occurrence of diagnosis code of this canacer in year t, conditional on not having the same code in the previous
Denominator or set of people for whom to calculate	People with first occurence of diagnosis code of this cancer confirmed in year t, conditional on not having the same code in the previous 24 months, conditional on not having the diagnosis date coincide with date of inpatient or outpatient record with a
Source of data 1	Constructed database on patients with dates of diagnosis and source of data.

Source of data 2	Outpatient record data for this cancer confirmed patients, outpatient manipulation data Inpatient record data for this cancer confirmed patients, inpatient manipulation data
Diagnosis and manipulation codes	Manipulation codes: under treatment codes for radiation therapy, cancer chemo procedure, cervical cancer chemo, hysterectomy, cone biopsy. We also include laser ablation (20065) and cryodestruction (20057) Diagnosis: cervical cancer confirmed
Outstanding issues	
Notes	Compute for 2011-2013. Observations with diagnosis date that coincide with date of inpatient or outpatient record with a treatment manipulation were excluded in order to compute the indicator. We considered only treatments within a year of diagnosis date and excluded any observation with treatment date before diagnosis date.
References	

Status	**DONE**
Indicator Nr	**C25**
Indicator	**% of 50-74 year olds receiving FOBT within the last year (EU QA guideline for colorectal cancer screening), separately by year**
Tracer	Colorectal cancer
Numerator or calculation	51-74 year olds in year t receiving at least one FOBT in year t
Denominator or set of people for whom to calculate	Total patients 51-74 year old in year t
Source of data 1	NHS outpatient databases: manipulation database Patient database
Source of data 2	
Diagnosis and manipulation codes	Manipulation Codes: 40161, 40173, 40172
Outstanding issues	Figures for this indicatorare below 8%. Pls check if we are excluding any relevant manipulation code.
Notes	
References	

Status	**DONE**
Indicator Nr	**C27**
Indicator	**Percentage of colo-rectal cancers diagnosed at Stage s= 0, I, II, III, IV, Unknown, Unavailable separately by year.**
Tracer	Colorectal cancer
Numerator or calculation	Colo-rectal cancer cases diagnosed in year t at stage s or unkonwn or unavailable
Denominator or set of people for whom to calculate	Persons with first diagnosis of this cancer at stage s in year t, conditional on not having the same code in the previous 24 months.
Source of data 1	Staging : Cancer registry.
Source of data 2	People: Constructed database on patients with dates of diagnosis and source of

	data.
Diagnosis and manipulation codes	Diagnosis: colorectal cancer confirmed. ICD-10 code for colo-rectal cancer is C18. Include all sub-codes, C18.0- Recto-sigmoid: C19 Rectum: C20 Carcinoid tumor of appendix, large intestine, rectum: C7A.02.Include all sub-codes, C7A.020-C7A.029
Outstanding issues	
Notes	Compute for 2011-2013. Years 2009 and 2010 are missing because we need 24 month lead to initial diagnosis . We excluded diagnoses made through the death registry. Around 55% of patients with first diagnosis of colorectal cancer (confirmed) in year t were not found in cancer registry in year t. Date of diagnosis in cancer registry is not precise. Also, it is not clear if date in cancer registry refers to first date of diagnosis. Note that in year 2014 numbers of observations in the cancer registry dramatically declined since August onwards. We merged datasets (by PID and by year of diagnosis). If person with diagnosis is not in cancer registry, we set staging to "unavailable". Note that in order to merge stages of cancer from cancer registry with list of people first diagnosis with cancer (in a given year) we used year of diagnosis and PID variables. Whitin a given year, the same patient could have more than one stage. We considered only the first stage occurred in that year.

Status	**DONE**
Indicator Nr	**C31**
Indicator	**Time elapsed (in days) between diagnosis (confirmed) and onset of treatment (radiation onc., chemo, surgery), separately by year for 2011, 2012, 2013**
Tracer	Colorectal cancer
Numerator or calculation	Onset of treatment: Start date of first inpatient or outpatient record that includes a manipulation code for treatment Date of diagnosis: first occurrence of diagnosis code of this canacer in year t, conditional on not having the same code in the previous
Denominator or set of people for whom to calculate	People with first occurence of diagnosis code of this cancer confirmed in year t, conditional on not having the same code in the previous 24 months, conditional on not having the diagnosis date coincide with date of inpatient or outpatient record with a
Source of data 1	Constructed database on patients with dates of diagnosis and source of data.
Source of data 2	Outpatient record data for this cancer confirmed patients, outpatient manipulation data Inpatient record data for this cancer confirmed patients, inpatient manipulation data
Diagnosis and manipulation codes	Manipulation codes: see colorectal chemo and colorectal cancer surgery. Diagnosis: colorectal cancer confirmed
Outstanding issues	
Notes	Observations with diagnosis date that coincide with date of inpatient or outpatient record with a treatment manipulation were excluded in order to compute the indicator. We considered only treatments within a year of diagnosis date and excluded any

	observation with treatment date before diagnosis date.
References	

Status	**DONE**
Indicator Nr	**M19**
Indicator	**% of initial diagnoses occuring at primary level**
Tracer	Depression
Numerator or calculation	Among people in the denominator: Number of people who had their initial diagnosis at the primary care level.
Denominator or set of people for whom to calculate	Number of people with a diagnosis of depression in year t, as per any NHS, SEMS or death registry database, who did not have this diagnosis in the preceding 12 months in any NHS or SEMS database.
Source of data 1	NHS inpatient and outpatient databases, SEMS database, death registry
Source of data 2	
Diagnosis and manipulation codes	See diagnosis codes in the diagnosis codes sheet
Outstanding issues	--
Notes	Compute for 2010-2014 Indicators M19 to M23 should add up to 100%
References	

Status	**DONE**
Indicator Nr	**M20**
Indicator	**% of initial diagnoses occuring at specialist outpatient level**
Tracer	Depression
Numerator or calculation	Among people in the denominator: Number of people who had their initial diagnosis in an outpatient specialist setting.
Denominator or set of people for whom to calculate	Number of people with a diagnosis of depression in year t, as per any NHS, SEMS or death registry database, who did not have this diagnosis in the preceding 12 months in any NHS or SEMS database.
Source of data 1	NHS inpatient and outpatient databases, SEMS database, death registry
Source of data 2	
Diagnosis and manipulation codes	See diagnosis codes in the diagnosis codes sheet
Outstanding issues	--
Notes	Compute for 2010-2014 Indicators M19 to M23 should add up to 100%
References	

Status	**DONE**
Indicator Nr	**M5**
Indicator	**# of GP visits per year, conditional on depression diagnosis**
Tracer	Depression
Numerator or calculation	For people in the denominator: Number of visits to a GP within 365 dayss of the first diagnosis of depression in year t
Denominator or set of people for whom to	Number of people with a diagnosis of depression in year t, as per any NHS or SEMS database.

calculate	
Source of data 1	Numerator: Visits to GPs: NHS outpatient payment data
Source of data 2	Denominator: Diagnosis of depression: diagnostic code for depression in outpatient, inpatient data or SEMS data
Diagnosis and manipulation codes	See diagnosis codes in the diagnosis codes sheet
Outstanding issues	
Notes	Compute for 2009-2013 Excludes diagnoses made through the death registry Uses the more narrow primary care physician approach (PCP specialist only), not the broader approach (PCP specialists plus non GP primary care providers)
References	

Status	**DONE**
Indicator Nr	**M10**
Indicator	**# of GP visits per year, conditional on substance abuse diagnosis**
Tracer	Substance abuse
Numerator or calculation	For people in the set: Number of GP visits within 365 days after the first diagnosis of depression in year t
Denominator or set of people for whom to calculate	Number of people with a diagnosis of substance abuse in year t, as per any NHS or SEMS database.
Source of data 1	Visits to GPs: NHS outpatient payment data
Source of data 2	Diagnosis of substance abuse: diagnostic code for substance abuse in outpatient, inpatient data or SEMS data
Diagnosis and manipulation codes	See diagnosis codes in the diagnosis codes sheet
Outstanding issues	
Notes	Compute for 2009-2013 Excludes diagnoses made through the death registry Uses the more narrow primary care physician approach (PCP specialist only), not the broader approach (PCP specialists plus non GP primary care providers)
References	

Status	**DONE**
Indicator Nr	**M6**
Indicator	**# of outpatient visits to mental health specialists, conditional on depression diagnosis**
Tracer	Depression
Numerator or calculation	For people in the denominator: Number of outpatient visits to a relevant specialist within 365 dayshs of the first diagnosis of depression in year t
Denominator or set of people for whom to calculate	Number of people with a diagnosis of depression in year t, as per any NHS or SEMS database.
Source of data 1	Numerator: Visits to mental health specialists: NHS outpatient payment data and specialist certificate database
Source of data 2	Denominator: Diagnosis of depression: diagnostic code for depression in outpatient, inpatient data or SEMS data
Diagnosis and	See diagnosis codes in the diagnosis codes sheet

manipulation codes	
Outstanding issues	
Notes	Compute for 2009-2013 Excludes diagnoses made through the death registry
References	

Status	**DONE**
Indicator Nr	**M11**
Indicator	**# of outpatient visits to relevant specialists per year, conditional on substance abuse diagnosis**
Tracer	Substance abuse
Numerator or calculation	For people in the set: Number of ambulance visits within 365 days after the first diagnosis of substance abuse in year t
Denominator or set of people for whom to calculate	Number of people with a diagnosis of substance abuse in year t, as per any NHS or SEMS database.
Source of data 1	Visits to mental health specialists: NHS outpatient payment data and specialist certificate database
Source of data 2	Diagnosis of substance abuse: diagnostic code for substance abuse in outpatient, inpatient data or SEMS data
Diagnosis and manipulation codes	See diagnosis codes in the diagnosis codes sheet
Outstanding issues	
Notes	Compute for 2009-2013 Excludes diagnoses made through the death registry
References	

Status	**DONE**
Indicator Nr	**M19**
Indicator	**% of initial diagnoses occuring at primary level**
Tracer	Substance abuse
Numerator or calculation	Among people in the denominator: Number of people who had their initial diagnosis at the primary care level.
Denominator or set of people for whom to calculate	Number of people with a diagnosis ofsubstance abuse in year t, as per any NHS, SEMS or death registry database, who did not have this diagnosis in the preceding 12 months in any NHS or SEMS database.
Source of data 1	NHS inpatient and outpatient databases, SEMS database, death registry
Source of data 2	
Diagnosis and manipulation codes	See diagnosis codes in the diagnosis codes sheet
Outstanding issues	--
Notes	Compute for 2010-2014 Indicators M19 to M23 should add up to 100%
References	
Status	**DONE**
Indicator Nr	**M20**

Indicator	**% of initial diagnoses occuring at specialist outpatient level**
Tracer	Substance abuse
Numerator or calculation	Among people in the denominator: Number of people who had their initial diagnosis in an outpatient specialist setting.
Denominator or set of people for whom to calculate	Number of people with a diagnosis ofsubstance abuse in year t, as per any NHS, SEMS or death registry database, who did not have this diagnosis in the preceding 12 months in any NHS or SEMS database.
Source of data 1	NHS inpatient and outpatient databases, SEMS database, death registry
Source of data 2	
Diagnosis and manipulation codes	See diagnosis codes in the diagnosis codes sheet
Outstanding issues	--
Notes	Compute for 2010-2014 Indicators M19 to M23 should add up to 100%
References	

Status	**DONE**
Indicator Nr	**M21**
Indicator	**% of initial diagnoses occuring in inpatient settings**
Tracer	Depression
Numerator or calculation	Among people in the denominator: Number of people who had their initial diagnosis in an inpatient setting.
Denominator or set of people for whom to calculate	Number of people with a diagnosis of depression in year t, as per any NHS, SEMS or death registry database, who did not have this diagnosis in the preceding 12 months in any NHS or SEMS database.
Source of data 1	NHS inpatient and outpatient databases, SEMS database, death registry
Source of data 2	
Diagnosis and manipulation codes	See diagnosis codes in the diagnosis codes sheet
Outstanding issues	--
Notes	Compute for 2010-2014 Indicators M19 to M23 should add up to 100%
References	

Status	**DONE**
Indicator Nr	**M21**
Indicator	**% of initial diagnoses occuring in inpatient settings**
Tracer	Substance abuse
Numerator or calculation	Among people in the denominator: Number of people who had their initial diagnosis in an inpatient setting.
Denominator or set of people for whom to calculate	Number of people with a diagnosis ofsubstance abuse in year t, as per any NHS, SEMS or death registry database, who did not have this diagnosis in the preceding 12 months in any NHS or SEMS database.
Source of data 1	NHS inpatient and outpatient databases, SEMS database, death registry
Source of data 2	
Diagnosis and manipulation codes	See diagnosis codes in the diagnosis codes sheet
Outstanding issues	--

Notes	Compute for 2010-2014 Indicators M19 to M23 should add up to 100%
References	

Status	**DONE**
Indicator Nr	**M23**
Indicator	**% of initial diagnoses occuring in the death registry**
Tracer	Depression
Numerator or calculation	Among people in the denominator: Number of people who had their initial diagnosis in the death registry.
Denominator or set of people for whom to calculate	Number of people with a diagnosis of depression in year t, as per any NHS, SEMS or death registry database, who did not have this diagnosis in the preceding 12 months in any NHS or SEMS database.
Source of data 1	NHS inpatient and outpatient databases, SEMS database, death registry
Source of data 2	
Diagnosis and manipulation codes	See diagnosis codes in the diagnosis codes sheet
Outstanding issues	--
Notes	Compute for 2010-2014 Indicators M19 to M23 should add up to 100%
References	

Status	**DONE**
Indicator Nr	**M23**
Indicator	**% of initial diagnoses occuring in the death registry**
Tracer	Substance abuse
Numerator or calculation	Among people in the denominator: Number of people who had their initial diagnosis in the death registry.
Denominator or set of people for whom to calculate	Number of people with a diagnosis ofsubstance abuse in year t, as per any NHS, SEMS or death registry database, who did not have this diagnosis in the preceding 12 months in any NHS or SEMS database.
Source of data 1	NHS inpatient and outpatient databases, SEMS database, death registry
Source of data 2	
Diagnosis and manipulation codes	See diagnosis codes in the diagnosis codes sheet
Outstanding issues	--
Notes	Compute for 2010-2014 Indicators M19 to M23 should add up to 100%
References	
Status	**DONE**
Indicator Nr	**M22**
Indicator	**% of initial diagnoses occuring via SEMS**
Tracer	Depression
Numerator or calculation	Among people in the denominator: Number of people who had their initial diagnosis in a SEMS setting.
Denominator or set of people for whom to calculate	Number of people with a diagnosis of depression in year t, as per any NHS, SEMS or death registry database, who did not have this diagnosis in the preceding 12 months in any NHS or SEMS database.

Source of data 1	NHS inpatient and outpatient databases, SEMS database, death registry
Source of data 2	
Diagnosis and manipulation codes	See diagnosis codes in the diagnosis codes sheet
Outstanding issues	--
Notes	Compute for 2010-2014 Indicators M19 to M23 should add up to 100%
References	

Status	**DONE**
Indicator Nr	**M22**
Indicator	**% of initial diagnoses occuring via SEMS**
Tracer	Substance abuse
Numerator or calculation	Among people in the denominator: Number of people who had their initial diagnosis in a SEMS setting.
Denominator or set of people for whom to calculate	Number of people with a diagnosis ofsubstance abuse in year t, as per any NHS, SEMS or death registry database, who did not have this diagnosis in the preceding 12 months in any NHS or SEMS database.
Source of data 1	NHS inpatient and outpatient databases, SEMS database, death registry
Source of data 2	
Diagnosis and manipulation codes	See diagnosis codes in the diagnosis codes sheet
Outstanding issues	--
Notes	Compute for 2010-2014 Indicators M19 to M23 should add up to 100%
References	

Status	**DONE**
Indicator Nr	**M02**
Indicator	**Percentage of patients with an active cancer diagnosis that have a diagnosis of depression**
Tracer	Depression and cancer
Numerator or calculation	Among people in the denominator: Number of people who were diagnosed with depression within 365 days after the first cancer diagnosis in year t
Denominator or set of people for whom to calculate	Number of people with a diagnosis of breast, cervical or colorectal cancer in any visit in year t
Source of data 1	Numerator: Diagnosis of depression: diagnostic code for depression in outpatient, inpatient data or SEMS data
Source of data 2	Denominator: Diagnosis of cancer: diagnostic code for breast, cervical or colorectal cancer in outpatient, inpatient, SEMS, or cancer registry data
Diagnosis and manipulation codes	See diagnosis codes in the diagnosis codes sheet
Outstanding issues	
Notes	Methodology is benchmarking against other countries. Both the denominator and the numerator exclude cases where the diagnosis was only made in the death registry.
References	

Status	DONE
Indicator Nr	**M03**
Indicator	**Percentage of postpartum patients diagnosed with depression**
Tracer	Postpartum depression
Numerator or calculation	Among women in the denominator: Number of women diagnosed with depression within 365 days after birth/delivery of their child
Denominator or set of people for whom to calculate	Number of women who had a birth/delivery in year t
Source of data 1	Numerator: Diagnosis of depression: NHS payment data, SEMS data
Source of data 2	Denominator: Births: Birth registry
Diagnosis and manipulation codes	See diagnosis codes in the diagnosis codes sheet
Outstanding issues	? Exclude women who died at birth
Notes	Methodology is benchmarking against other countries. Compute for 2009-2013 The numerator exclude cases where the diagnosis of depression was only made in the death registry. For the yearly indicators: For women with multiple births in one year: only take
References	

Status	DONE
Indicator Nr	**M24**
Indicator	**Timing of first follow-up visit with a mental health specialist for inpatient discharges with a depression diagnosis (within 30 days, within 31- 60, within 61-90 days, none within 90 days)**
Tracer	Depression
Numerator or calculation	For the inpatient discharges in the denominator: dummy for whether the person discharged had a first follow-up visit with a mental health specialist within 30 /31-60/61-90 days of the discharge
Denominator or set of people for whom to calculate	Inpatient discharges for which the discharge diagnostic codes include a depression code. Include only discharges to home.
Source of data 1	Follow-up visits: NHS outpatient data; Specialties: specialty certificate database
Source of data 2	Inpatient discharges: Inpatient movement data
Diagnosis and manipulation codes	See diagnosis codes in the diagnosis codes sheet
Outstanding issues	5% of hospital discharges are ficitious and can't be matched to a follow up inpatient stay
Notes	--
References	

Status	DONE
Indicator Nr	**M27**
Indicator	**Timing of the first follow-up visit to a mental health specialist for inpatient discharges with a substance abuse diagnosis (within 30 days, within 31-60, within 61-90 days, or none within 90 days)**

Tracer	Substance abuse
Numerator or calculation	For the inpatient discharges in the denominator: (Sum of) Dummy for whether the person discharged had a first follow-up visit with a mental health specialist within 30/31-60/61-90 days of the discharge
Denominator or set of people for whom to calculate	Number of hospital discharges for which the discharge diagnostic codes include a substance abuse code. Include only discharges to home.
Source of data 1	Follow-up visits: NHS outpatient data; Specialties: specialty certificate database
Source of data 2	Inpatient discharges: Inpatient movement data
Diagnosis and manipulation codes	See diagnosis codes in the diagnosis codes sheet
Outstanding issues	--
Notes	--
References	

APPENDIX 2: SPECIALTY CODES

This table **contains the specialty codes that were used to identify specialists in each specialty.**

	Specialist codes	Specialist name
Primary care physician (pcp)		
	P01	internist
	P02	Family (general practice) doctor
Cardiology (cardio)		
	A011	cardiologist
	A153	pediatric cardiologist
	P06	heart surgeon
	P05	thoracic surgeon
	P52	cardiologist
Neurology (neuro)		
	P04	neurosurgeon
	P20	neurologist
	PP21	child neurologist
Oncology (onco)		
	A142	oncology gynecologist
	A161	oncology chemotherapist
	A162	oncology surgeon
	A163	oncology gynecologist
	P16	oncologist chemotherapist
	P16_	oncologist
	P55	oncologist
Mental health (mental)		
	A191	child psychiatrist
	A192	forensic psychiatry expert
	M41	psychoorganic psychoanalysis
	N103	psychotherapist (AAP)
	P19	psychiatrist
	P28	drug addiction
	P42	psychotherapist
	n05	pyschologist

	M46	alcohol, drugs and psychotropic substances impact test method
Endocrinology (diabetes)		
	A014	Endocrinologist
	A156	child endocrinologist

APPENDIX 3: MANIPULATION CODES

This table contains the manipulation codes that were used to identify certain manipulations in the NHS data.

****manipulation codes within the same cell separated by a space**		
**** Parentheses indicate that manipulations must come together**		
	Procedure/test	**Manipulation code**
SCREENING EXAMS		
	Family Doctor's Adult General Health Check	01016 60404
	Family Doctor's Adult General Health Check in patients with pre-existing diseases	60405
	Consultation on healthy lifestyle in patients with DM II, CAD, HTN, COPD, Smoking)	60231
	OB/GYN care of pregnant woman	01070
	Midwives care of pregnant woman	01029
	Family Doctor's care of pregnant woman	01062
	Family Doctor gyn examination for cancer screening	01063
	OB/GYN visit for cancer screening	01004
LABS		
	Glucose and Ketone Bodies in Urine (Laboratory)	40135
	Urine analysis with test strip (laboratory)	40148
	Urine test for microalbuminuria	41101
	Serum creatinine test (laboratory)	41006
	Serum triglycerides test (laboratory)	41046
	Serum HDL (laboratory)	41047 41054
	Total Cholesterol (laboratory)	41056 41057 41045
	LDL Cholesterol (laboratory)	41058 41059 41060 41055
	Glucose Load Test (laboratory)	41096
	HbA1c (laboratory)	41103 41104 41105 41097
	Tests for syphilis (laboratory)	41230 41232 41233 41236 41237 41251 41253
	Tests for gonorrhea (laboratory)	41234 41235 41286
	Tests for chlamydia (laboratory)	41240 41245 41254 41255 41262 41287 41290 41291
	Tests for HIV (laboratory)	41401 41402 41404 41405

	Cytological Examination of the Cervical Canal (Pap smear)	42004 42026 42027 42028 42029 42030 42031 42032 42033 42019 42020 42021 42022 42023 42024 42025 42003
	Pap smear by a OB/GYN, family doctor, midwife, Physician assistance,	42026 42027 42028 42029 42030 42031 42003 01063 01004
	Occult Blood in Stool	40161
	Negative FOBT	40173
	Positive FOBT	40172
OTHER DIAGNOSTICS		
	Electrocardiogram with 12 leads (EKG)	06003 06004 06006 06008 06011 06012.
	Mammography	50096 50097 50102 50105 50188 50189 50190 50191 50192 60258
	Ultrasound guided needle biopsy	50720 50721 50722
	Guided needle biopsy	50731 50732 50735 50736 50737
	Sentinel Lymph node biopsy or lymph node dissection	20041 50260 50406 50274
	Breast biopsy wall	31175
	Vagina and cervical biopsy using colposcopes	16001
	Cervical cone elektroekscīzija	16007
	Vagina and cervix biopsy	16008
	Puncture biopsy in operation room	20039
	Superficial tissue puncture biopsy	20040
	Soft tissue and/or lymph node biopsy	29183
	Biopsy or intra-abdominal abscess opening	21021
	Rectoscopy	08110
	Sigmoidoscopy with flexible instruments, including rektoskopiju	08111
	Colon investigation with flexible instruments, including rektoskopiju to lean angle	08112
	Colon investigation with flexible endoscopes, including rektoskopiju Sigmoidoscopy and sample excision and / or puncture	08113
	Capsule endoscopy	08108
	Endosonogrāfija using flexible endoscopes	08120
	Diagnostic endoscopic ultrasonography with sectoral detector endoscope	08122
	CT scan	50509 50609 50130
TREATMENT		

	Radiation Therapy (Radiotherapy)	(60110 50300) (60110 50301) (60110 50302) (60110 50303) 50340 50341 50342 50343 50346 50349 50352 50353 50356 50357 50360 50366 50363 50370 50371 50372 50373 50374 50390 50393 50396 50397 50416 50417 50425 50426 50427 50428 50429 50430 50431 50432 50433 50434 50438
	Cancer chemotherapy procedure	60008
	Cervical cancer - chemo	61060 61118 61119 61100 61123 61124 61126 61127 61128 61129
	Breast cancer - chemo	61074 61075 61076 61077 61078 61079 61080 61081 61082 61083 61084 61085 61086 61088 61089 61090 61091 61092 61093 61005 61024 61031 61074 61075 61076 61077 61081 61099 61100 61101 61102 61103 61106 61107 61108 61109 61110 61111 61112 61005 61024 61005 61031 61024
	Colorectal - chemo	61019 61021 61023 61024 61025 61026 61027 61028
	Colo-Rectal Cancer Surgery types	21040 21041 21042 21062 21063 21064 21065 21110 21111 21113 21114 21115 21190 21192
	Needle ablation of tumor	50733
	Breast sectoral resection (partial mastectomy)	21022
	Radical mastectomy	21047
	Thrombolytics	50118

APPENDIX 4: DIAGNOSIS CODES

This table **contains the diagnosis codes that were used to identify persons with the listed condition in the NHS, SEMS, CDPC, medication and other data.**

	ICD-10 Code	ICD-10 Name	SEMS Code	SEMS Name
Acute myocardial infarction (AMI)				
	I21 + all sub-codes	ST elevation (STEMI) and non-ST elevation (NSTEMI) myocardial infarction		
	I22 + all sub-codes	Subsequent ST elevation (STEMI) and non-ST elevation (NSTEMI) myocardial infarction		
	I24.8	Other forms of acute ischemic heart disease		
	I24.9	Acute ischemic heart disease, unspecified		
			232	myocardial infarction
			232A	I21-I22 Myocardial infarction
			232B	I21.0-I21.3; I21.9; I22.0-I22.9 Acute coronary syndrome with ST depression,
			2320	myocardial infarction
Stroke and cerebrovascular disease				
	I60+ all subcodes, I61+all subcode, I62+ all subcodes	Hemorrhagic stroke		
	I63 + all subcodes, I64 + all subcodes	Cerebral infarction		
			241D	I63 Cerebral infarction
Cardiomyopathy				
	I42 + all subcodes	Cardiomyopathy		
	I25.5	Ischemic cardiomyopathy		

			235	CHD, kardioskleroze post-infarction with complications
			235A	I25 Chronic ischemic heart disease *(with complications)*
Diabetes				
	E08 + all sub-codes	DM due to underlying condition		
	E09 + all sub-codes	Drug or chemical induced diabetes mellitus		
	E10 + all subcodes	Type 1 Diabetes Mellitus		
	E11 + all subcodes	Type 2 Diabetes Mellitus		
	E13 + all subcodes	Other specified diabetes mellitus		
			201	Diabetes, decompensated (excluding hypoglycemia diet mistake)
			201A	E10-E14 Diabetes mellitus
			3010	Diabetes, compensated
			301A	E10-E14 Diabetes mellitus, compensated
			2010	Diabetes, decompensated
Hypertension				
	I10 + all subcodes	Essential (primary) HTN		
	I11 + all subcodes	Hypertensive heart disease		
	I12 + all subcodes	Hypertensive chronic kidney disease		
	I13 + all subcodes	Hypertensive heart and chronic kidney disease		
	I15 + all subcodes	Secondary hypertension		
			344	Arterial hypertension without crisis
			344A	I10-I15 Hypertensive diseases *(non-emergency)*
			3440	Arterial hypertension without crisis
Congestive heart failure (CHF)				

	I11.0	Hypertensive heart disease with heart failure		
	I11.3	Hypertensive heart and chronic kidney disease with heart failure and stage 1 through stage 4 chronic kidney disease, or unspecified chronic kidney disease		
	I50 + all subcodes	Heart Failure		
	I09.81	Rheumatic heart failure		
			231	Arterial hypertension with urgent crisis Coupe
			231A	I10-I15 Hypertensive diseases *(Coupe with urgent crisis)*
			2310	Arterial hypertension with urgent crisis Coupe
			342	Rheumatic heart disease without exacerbation
			342A	I05-I09 Chronic rheumatic heart disease
			3420	Rheumatic heart disease without exacerbation
			236	Rheumatic heart disease with complications
			236A	I05-I09 Chronic rheumatic heart disease
			2360	Rheumatic heart disease with complications
Coronary artery disease (CAD)				
	I20 + all subcodes	Angina Pectoris		
	I25 + all subcodes	Chronic ischemic heart disease		
			235	CHD, kardioskleroze post-infarction with complications
			235A	I25 Chronic ischemic heart disease *(with complications)*

			2350	CHD, kardioskleroze post-infarction with complications
			233	unstable angina
			233A	I20.0-I20.1 Unstable angina
			2330	unstable angina
			234	stenocardia
			234A	I20.8-20.9 Angina
			2340	stenocardia
			341	CHD without exacerbation
			341A	I25 Chronic ischemic heart disease *(without exacerbation)*
			3410	CHD without exacerbation
Breast cancer				
	C50 + all subcodes	Malignant neoplasm of breat		
	D05.1 + all subcodes	Carcinoma in situ of breast		
			319D	C50 breast cancer
Cervical cancer				
	C53 + all subcodes	Malignant neoplasm of cervix uteri		
	D06 + all subcodes	Carcinoma in situ of cervix uteri		
Colorectal cancer				
	C18 + all subcodes	Malignant neoplasm of colon		
	C19	Malignant neoplasm of rectosigmoid junction		
	C20	Malignant neoplasm of rectum		
	C7A.02 + all subcodes	Malignant carcinoid tumors of the appendix, large intestine, and rectum		
	D01.0	Carcinoma in situ of colon		
	D01.1	Carcinoma in situ of rectosigmoid junction		
	D01.2	Carcinoma in situ of		

		rectum		
			3110	Digestive malignancies
Depression				
	F32 + all subcodes	Major depressive disorder, single episode		
	F33 + all subcodes	Major depressive disorder, recurrent		
	F34 + all subcodes	Persistent mood [affective] disorders		
	F39	Unspecified mood [affective] disorder		
	F31 + all subcodes	Bipolar disorder		
	F53	Puerperal psychosis (post-partum depression)		
			214	Life-threatening depression
			214A	F32-F33 major depressive episode; recurrent depressive disorder
			2140	Life-threatening depression
Substance abuse				
	F10 + all subcodes	Alcohol related disorders		
	F11 + all subcodes	Opioid related disorders		
	F12 + all subcodes	Cannabis related disorders		
	F13 + all subcodes	Sedative, hypnotic, or anxiolytic related disorders		
	F14 + all subcodes	Cocaine related disorders		
	F15 + all subcodes	Other stimulant related disorders		
	F16 + all subcodes	Hallucinogen related disorders		
	F17 + all subcodes	Nicotine dependence		
	F18 + all subcodes	Inhalant related disorders		
	F19 + all subcodes	Other psychoactive substance related disorders		
	O99.31 + all subcodes	Alcohol use complicating pregnancy, childbirth, and the puerperium		

	O99.32 + all subcodes	Drug use complicating pregnancy, childbirth, and the puerperium		
	Z71.41	Alcohol abuse counseling and surveillance…of alcoholic		
	Z71.51	Drug abuse counseling and surveillance…of drug abuser		
	Z71.6	Tobacco abuse counselling		
	F55	Abuse of non-psychactive substances (antacids, herbal or folk remedies, laxatives, steroids or hormones, vitamins, and other non-psychoactive substances)		
			212	Alcohol intoxication and other psychoses, delirium
			212A	F10.4-F10.5 Withdrawal state with delirium, psychotic disorder due to alcohol
			212B	F10.9 Mental and behavioral disorders due to alcohol (alcohol effects, alcohol intoxication)
			212C	F10.9 Mental and behavioral disorders due to alcohol (alcohol effects, alcohol intoxication)
			321	Chronic alcoholism, abstinence, raft
			321A	F10.2 Chronic alcoholism
			321B	F10.3 Alcohol withdrawal state
			322	Drug addiction, toxic substance (t.sk.abstinence)
			322A	Addiction syndrome F19.2 use of psychoactive substances

			322B	F19.3 Withdrawal state of use of psychoactive substances
			2120	Alcohol intoxication and other psychoses, delirium
			3210	Chronic alcoholism, abstinence, raft
			3220	Drug addiction, toxic substance (t.sk.abstinence)
Selfharm and suicide				
	T14.91	Suicide attempt		
	X60 + all subcodes	Intentional poisoning non-narcotic analgesics, antipyretics and antirheumatic agents		
	X61 + all subcodes	Intentional poisoning and exposure to anticonvulsants, hypnotics and sedatives, anti-parkinsonian and psychotropic drugs		
	X62 + all subcodes	Intentional poisoning and exposure to narcotic and Psycholeptics (hallucinogens) preparations		
	X63 + all subcodes	intentional contamination with other therapeutic agents that act on the autonomic nervous system		
	X64 + all subcodes	Intentional poisoning by other and unspecified treatments, medicines and biological substances		
	X65 + all subcodes	Intentional poisoning with alcohol		
	X66 + all subcodes	Intentional poisoning and exposure to organic solvents and halogenated hydrocarbons and their vapors		
	X67 + all subcodes	Intentional poisoning and exposure to other gases and vapors		

	X68 + all subcodes	Intentional poisoning and exposure to pesticides		
	X69 + all subcodes	Intentional poisoning and exposure to other and unspecified chemicals and noxious substances		
	X70 + all subcodes	Intentional self-harm, by hanging, strangulation, suffocation		
	X71 + all subcodes	Intentional self-harm, drowning and drowning		
	X72 + all subcodes	Intentional self-harm, firing a hand gun		
	X73 + all subcodes	Intentional self-harm, firing a rifle, shotgun and larger firearm		
	X74 + all subcodes	Intentional self-harm, firing with other and unspecified firearm		
	X75 + all subcodes	Intentional self-harm with explosives		
	X76 + all subcodes	Intentional self-harm by smoke, fire and flames		
	X77 + all subcodes	Intentional self-harm by steam, hot vapors and hot objects		
	X78 + all subcodes	Intentional self-harm by sharp object		
	X79 + all subcodes	Intentional self-harm by blunt object		
	X80 + all subcodes	Intentional self-harm, jumped from a height		
	X81 + all subcodes	Intentional self-harm, jumps or lying-moving object in front		
	X82 + all subcodes	Intentional self-harm a motor vehicle accident		
	X83 + all subcodes	Intentional self-harm by other specified means		
	X84 + all subcodes	Intentional self-harm by unspecified means		

			172	Suffocation and hanging oneself
			172A	T71 Asphyxia
			1720	Suffocation and hanging oneself