I E G U L D Ī J U M S T A V Ā N Ā K O T N Ē

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" 8.nodevums – **An operational manual that provides guidance for monitoring system bottlenecks**

World Bank Reimbursable Advisory Services:

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

Bottleneck Analysis
OPERATIONAL MANUAL

This document describes the data and methods used in the Bottleneck Analysis study of the World Bank and explains how all submitted materials can be used to replicate the results in the future or recalculate indicators with different assumptions. The study used tracer conditions within each priority disease area to illuminate performance issues in the health system that may impede patients' timely access to services and depress quality of care. 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.

Source data

The study used administrative data provided by the National Health Service (NHS), the Center for Disease Prevention and Control (CDPC), and the State Emergency Medical Services (SEMS) to assess performance related to the steps of a patient pathway - screening, diagnosis, treatment, and management and follow-up care - for select tracer conditions. Appendix 1 lists all data sets shared with the World Bank that were used in the Bottleneck Analysis. 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 the anonymized data on two secure servers. For the analysis, all data were imported, cleaned, merged when necessary, and analyzed using Stata/MP 14.2 software.

Replication files

All Stata commands used in the Bottleneck Analysis appear in an accompanying set of annotated do-files, which can be opened in any text editor (*Bottleneck_DoFiles.zip*). 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. 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.

Two files in particular (*00-master_path.do* and *01-master_run.do*) can be used to replicate every indicator, starting from the raw data, as they execute all data cleaning tasks, all database and variable construction, and every calculation in the correct sequence. Each indicator typically has its own corresponding do-file, and each of these do-files can also be re-run individually to recalculate individual results.[1] For example, if an analyst wishes to use an augmented set of procedure (or "manipulation") codes for an indicator, these codes can be changed in the individual do-file, the file can be re-run, and Stata will automatically generated an updated excel file that stores the results. Similarly, if an analyst wants to use data from a different year and the raw data in Excel maintains the same structure as the data sets shared with the World Bank, (s)he would have to change some code in the do-files that import and construct analytical data sets and then re-run all of the individual do-files on the new data (that is, files in the *1-import-data*, *2-clean-source-data*, and *3-construct-databases* folders in *Bottleneck_DoFiles.zip*.

[1] Sometimes indicators were grouped into a single do-file if the steps required for their calculation were similar.

The do-files are annotated, describing each step of an indicator's calculation. Thus, an analyst familiar with working with datasets and databases with another statistical software package should be able follow the steps and replicate them in the appropriate sequence using his/her software of choice.

In the event that an analyst wishes to start the analysis from scratch, Appendix 2 describes the calculation of each indicator in words.

Identifying patients with tracer conditions

To construct lists of patients exhibiting a certain tracer condition – for example, all hypertension patients for a given year – the World Bank 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]

In any case, these assumptions on identifying patients can be changed in the files in the *3-construct-databases* folder of *Bottleneck_DoFiles.zip*.

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

[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.

diagnoses received certain manipulations, the timing of these services, and the identity of the physician providing them. These calculations appear in the *4-construct-variables* variables folder of *Bottleneck_DoFiles.zip*.[5] Appendix 3 presents the codes used to identify specialists in a particular domain (for example, mental health specialist). Appendix 4 also lists the manipulation codes corresponding to each examination, diagnostic, treatment, and procedure used in the analysis.[6] Appendix 5 describes overall dataset construction.

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.

Results

All indicators calculated for the study appear in two accompanying documents:

(i) *Bottleneck Analysis* – a report that presents and discusses select indicators for each step of the patient pathway and suggests policy remedies for each identified bottleneck, or place where patients appear to get stuck as they move through the health system.

(ii) *Patient Bottleneck Study* – a deck of PowerPoint slides that presents all indicators calculated by the World Bank. It is also possible to automatically update the charts in this presentation by linking the corresponding cells to Stata output files. Then when the Stata output files get updated when do-files are re-run, the charts will automatically get updated.

[5] The World Bank team ended up not using the *5-analyze-variables* folder for the main analysis.

[6] 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).

Appendix 1: Source data

Data set	Source
All inpatient services paid by the NHS, 2009-2014: *PB_SPANS_tab1.dsv* *PB_SPANS_tab2.dsv* *PB_SPANS_tab31.dsv* *PB_SPANS_tab32.dsv* *PB_SPANS_tab4.dsv*	NHS
All outpatient services paid by the NHS, 2009-2014: *PB_1_2009_1kvart.zip* *PB_1_2009_2kvart.zip* *PB_1_2009_3kvart.zip* *PB_1_2009_4kvart.zip* *PB_1_2010_1kvart.zip* *PB_1_2010_2kvart.zip* *PB_1_2010_3kvart.zip* *PB_1_2010_4kvart.zip* *PB_1_2011_1kvart.zip* *PB_1_2011_2kvart.zip* *PB_1_2011_3kvart.zip* *PB_1_2011_4kvart.zip* *PB_1_2012_1kvart.zip* *PB_1_2012_2kvart.zip* *PB_1_2012_3kvart.zip* *PB_1_2012_4kvart.zip* *PB_1_2013_1kvart.zip* *PB_1_2013_2kvart.zip* *PB_1_2013_3kvart.zip* *PB_1_2013_4kvart.zip* *PB_1_2014_1kvart.zip*	NHS

PB_1_2014_2kvart.zip *PB_1_2014_3kvart.zip* *PB_1_2014_4kvart.zip* *PB_2_2009man.zip* *PB_2_2010man.zip* *PB_2_2011man.zip* *PB_2_2012man.zip* *PB_2_2013man.zip* *PB_2_2014man.zip*	
All health care staff and their certifications: *hc_persons.dsv*	NHS
Cancer Registry, 2009-2014: *Cancer.xlsx*	CDPC
Death Registry, 2009-2014: *mirusie_2009.xlsx* *mirusie_2010.xlsx* *mirusie_2011.xlsx* *mirusie_2012.xlsx* *mirusie_2013.xlsx* *mirusie_2014.xlsx*	CDPC
Perinatal Death Registry, 2009-2014: *mirusi_perinat2009_2014.xlsx*	CDPC
Diabetes Registry, 2009-2014: *Diabetes_2009_2013.xlsx* *Diabetes_2014.xlsx*	CDPC
Mental health registry, 2009-2014: *Mental_health.xlsx*	CDPC
Substance abuse registry:	CDPC

Drug_abuse_2009_2012.xlsx *Drug_abuse_2013_2014.xlsx*	
Emergency calls: *ADIS_DB_2011.xlsx* *ADIS_DB_2012.xlsx* *ADIS_DB_2013.xlsx* *EMY_DB_2013.xlsx* *EMY_DB_2014.xlsx*	SEMS
Cancer screening letters: *PB_OVS.dsv*	NHS

Appendix 2: Calculation of each indicator

Status	**DONE**
Indicator Nr	**CVD2**
Indicator	**% of hypertension patients who have an annual well visit**
Tracer	Hypertension
Numerator or calculation	Among people in the denominator: Number of people who had a well visit within 365 days of first appearance of hypertension diagnosis 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	Manipulation codes: 01016 60404 60405 60231 01063 01004
Outstanding issues	
Notes	Compute for 2009-2013 Excludes diagnoses made through the death registry
References	

Status	**DONE**
Indicator Nr	**CVD3**
Indicator	**% of hypertension patients with healthy lifestyle consultation with their GP**
Tracer	Hypertension
Numerator or calculation	Among people in the denominator: Number of people who had a healthy lifestyle consultation within 365 days of first appearance of hypertension diagnosis 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	Manipulation codes: 60231
Outstanding issues	
Notes	Compute for 2009-2013 Excludes diagnoses made through the death registry
References	

Status	**DONE**
Indicator Nr	**CVD3b**
Indicator	**% of hypertension patients with a blood pressure check????**
Tracer	Hypertension
Numerator or calculation	Among people in the denominator: Number of people who had a blood pressure check within 365 days of first appearance of hypertension diagnosis 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	Manipulation code: 60232
Outstanding issues	
Notes	Compute for 2009-2013 Excludes diagnoses made through the death registry
References	

Status	**DONE**
Indicator Nr	**CVD3c**
Indicator	**% of hypertension patients with a cardio risk assessment ????**
Tracer	Hypertension
Numerator or calculation	Among people in the denominator: Number of people who had a cardio risk assessment within 365 days of first appearance of hypertension diagnosis 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	Manipulation code: 60233
Outstanding issues	
Notes	Compute for 2009-2013 Excludes diagnoses made through the death registry
References	

Status	DONE
Indicator Nr	**CVD4a_total, CVD4b_LDL, CVD4c_HDL**
Indicator	**% of hypertension patients with cholesterol (total & fraction) tests performed annually**
Tracer	Hypertension
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 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	Total: 41056 41057 41045 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	**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	**CVD8**
Indicator	**Percentage of hypertension patients with annual ECG**
Tracer	Hypertension
Numerator or calculation	Among people in the denominator: Number of people who had ECG 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	ECG: 06003 06004 06005 06013 06006; 06008; 06011; 06012.
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	**CVD9**
Indicator	**% of initial diagnoses occuring at primary level**
Tracer	Hypertension
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 hypertension 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	
Outstanding issues	
Notes	
References	

Status	**DONE**
Indicator Nr	**CVD10**
Indicator	**% of initial diagnoses occuring at outpatient specialist level**
Tracer	Hypertension
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 hypertension 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	
Outstanding issues	
Notes	
References	

Status	**DONE**
Indicator Nr	**CVD11**
Indicator	**% of initial diagnoses occuring at inpatient level**
Tracer	Hypertension
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 hypertension 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	
Outstanding issues	
Notes	
References	

Status	**DONE**
Indicator Nr	**CVD12**
Indicator	**% of initial diagnoses occuring via SEMS**
Tracer	Hypertension
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 hypertension 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	
Outstanding issues	
Notes	
References	

Status	**DONE**
Indicator Nr	**CVD13**
Indicator	**% of initial diagnoses occuring at death**
Tracer	Hypertension
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 hypertension 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	
Outstanding issues	
Notes	
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	**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	**CVD16**
Indicator	**% of diabetes patients who have an annual well visit with their GP**
Tracer	Diabetes
Numerator or calculation	Among people in the denominator: Number of people who had a well visit within 12 months of first appearance of diabetes diagnosis 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	Manipulation codes: 01016 60404 60405 60231
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	**CVD17**
Indicator	**% of diabetes patients with a healthy lifestyle consultation with their GP**
Tracer	Diabetes
Numerator or calculation	Among people in the denominator: Number of people who had a healthy lifestyle consultation within 365 days of first appearance of diabetes diagnosis 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	Manipulation codes: 60231
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	**CVD17b**
Indicator	**% of diabetes patients with a blood pressure check ???**
Tracer	Diabetes
Numerator or calculation	Among people in the denominator: Number of people who had a blood pressure check within 365 days of first appearance of diabetes diagnosis 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	Manipulation code: 60232
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	**CVD17c**
Indicator	**% of diabetes patients with a cardio risk assessment???**
Tracer	Diabetes
Numerator or calculation	Among people in the denominator: Number of people who had a cardio risk assessment within 365 days of first appearance of diabetes diagnosis 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	Manipulation code: 60233
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 manipulation codes	Total: 41056 41057 41045 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	**CVD22a**
Indicator	**Percentage of diabetes patients with annual eye exam**
Tracer	Diabetes
Numerator or calculation	Among people in the denominator: Number of people who had an eye exam 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	Manipulation codes:01065
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	**CVD22b**
Indicator	**Percentage of diabetes patients with annual eye exam**
Tracer	Diabetes
Numerator or calculation	Among people in the denominator: Number of people who had an eye exam 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	Manipulation codes:01065 Also includes all eye exams: 17001-17120.
Outstanding issues	This will likely provide an overstimate since some of these eye exams could be triggered by a diabetes-related problem.
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	**CVD23**
Indicator	**% of initial diagnoses occuring at primary level**
Tracer	Diabetes
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 diabetes 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	
Outstanding issues	
Notes	
References	

Status	**DONE**
Indicator Nr	**CVD24**
Indicator	**% of initial diagnoses occuring at outpatient specialist level**
Tracer	Diabetes
Numerator or calculation	Among people in the denominator: Number of people who had their initial diagnosis with a specialist in an outpatient setting.
Denominator or set of people for whom to calculate	Number of people with a diagnosis of diabetes 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	
Outstanding issues	
Notes	
References	

Status	**DONE**
Indicator Nr	**CVD25**
Indicator	**% of initial diagnoses occuring at inpatient level**
Tracer	Diabetes
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 diabetes 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	
Outstanding issues	
Notes	
References	

Status	**DONE**
Indicator Nr	**CVD26**
Indicator	**% of initial diagnoses occuring via SEMS**
Tracer	Diabetes
Numerator or calculation	Among people in the denominator: Number of people who had their initial diagnosis in the SEMS setting.
Denominator or set of people for whom to calculate	Number of people with a diagnosis of diabetes 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	
Outstanding issues	
Notes	
References	

Status	**DONE**
Indicator Nr	**CVD27**
Indicator	**% of initial diagnoses occuring at death**
Tracer	Diabetes
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 diabetes 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	
Outstanding issues	
Notes	
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	38
Indicator Nr	**CVD30a, CVD30b, CVD30c**
Indicator	**% of patients diagnosed with with AMI, CAD or CHF who had at least one visit to a cardiologist**
Tracer	CAD/ AMI/ CHF (separately)
Numerator or calculation	For people in the denominator: (Sum of) Dummy for outpatient visit to a cardio specialist within 365 days of the first diagnosis of AMI/CAD/CHF in year t
Denominator or set of people for whom to calculate	Number of people with a diagnosis of AMI/CAD/CHF 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	**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	
Notes	Cross check results against previous calculations from Center for Health Economics, to ensure consistency.
References	

Status	DONE
Indicator Nr	**CVD33a, CVD33b, CVD33c**
Indicator	**30 day readmission rate after inpatient stay related to CAD/ AMI/ CHF**
Tracer	CAD/ AMI/ CHF (separately)
Numerator or calculation	For the inpatient discharges in the denominator: (Sum of) Dummy for whether the person discharged was readmitted in the 30 days after 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	Inpatient admissions: inpatient movement data
Source of data 2	Inpatient discharges: Inpatient movement data
Diagnosis and manipulation codes	
Outstanding issues	
Notes	Only include discharges to the home
References	

Status	DONE
Indicator Nr	**CVD35**
Indicator	**Patient-based AMI 30 day (in hospital and out-of-hospital) mortality**
Tracer	AMI
Numerator or calculation	For the inpatient admissions in the denominator: (Sum of) Dummy for whether the patient died between the date of the admission and the date of the admission+30
Denominator or set of people for whom to calculate	Number of patients admitted in year t for which the admission diagnostic codes includes an AMI.
Source of data 1	Mortality: person list with date of death
Source of data 2	Inpatient discharges: Inpatient movement data
Diagnosis and manipulation codes	See diagnosis codes in the diagnosis codes sheet
Outstanding issues	This indicator uses admission diagnostic. There is some lack of overlap between codes at admission and discharge.
Notes	For 2014: do not include admissions that happened after November 30, 2014 The year (t) corresponds to the year of admission This is based on the OECD indicator for the same - OECD average 9.5% (OECD Health at a Glance 2015 for 2013).
References	

Status	DONE
Indicator Nr	**CVD36**
Indicator	**Patient-based hemorrhagic stroke 30 day (in hospital and out-of-hospital) mortality**
Tracer	Hemorrhagic stroke
Numerator or calculation	For the inpatient admissions in the denominator: (Sum of) Dummy for whether the patient died between the date of the admission and the date of the admission+30
Denominator or set of people for whom to calculate	Number of patients admitted in year t for which the admission diagnostic codes includes a hemorrhagic stroke.
Source of data 1	Mortality: person list with date of death
Source of data 2	Inpatient discharges: Inpatient movement data
Diagnosis and manipulation codes	See diagnosis codes in the diagnosis codes sheet
Outstanding issues	This indicator uses admission diagnostic. There is some lack of overlap between codes at admission and discharge.
Notes	For 2014: do not include admissions that happened after November 30, 2014 The year (t) corresponds to the year of admission.

	This indicator was computed using a version of the inpatient episodes database that has major cleanup.
References	

Status	**DONE**
Indicator Nr	**CVD39**
Indicator	**Patient-based ischemic stroke 30 day (in hospital and out-of-hospital) mortality**
Tracer	Ischemic stroke
Numerator or calculation	For the inpatient admissions in the denominator: (Sum of) Dummy for whether the patient died between the date of the admission and the date of the admission+30
Denominator or set of people for whom to calculate	Number of patients admitted in year t for which the admission diagnostic codes includes an Ischemic stroke.
Source of data 1	Mortality: person list with date of death
Source of data 2	Inpatient discharges: Inpatient movement data
Diagnosis and manipulation codes	See diagnosis codes in the diagnosis codes sheet
Outstanding issues	This indicator uses admission diagnostic. There is some lack of overlap between codes at admission and discharge.
Notes	For 2014: do not include admissions that happened after November 30, 2014 The year (t) corresponds to the year of admission This is based on the OECD indicator for the same - OECD average 10.1 % (Health at a glance 2015 for 2013)
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	
Notes	Model on M27
References	

Status	**DONE**
Indicator Nr	**CVD40**
Indicator	**Percentage of inpatient admissions with stroke diagnosis for which patient received a CT can on day of admission or next day**
Tracer	Stroke
Numerator or calculation	For the inpatient admissions in the denominator: (Sum of) dummy for whether the patient received a CT scan on the day of admission or on the next day
Denominator or set of people for whom to calculate	Number of hospital admissions for which the admission diagnostic code includes a stroke code
Source of data 1	Numerator: CT scans: NHS inpatient manipulation data
Source of data 2	Denominator: Inpatient admissions: inpatient movement data
Diagnosis and manipulation codes	See diagnosis codes in the diagnosis codes sheet; see manipulation codes in the manipulations code sheet
Outstanding issues	
Notes	Assumes Date entered for CT scan manipulation is accurate - so it reflects the date of the procedure, and not the time of recording of the procedure.
References	

Status	DONE
Indicator Nr	**CVD41**
Indicator	**Discharge to usual place of residence within 56 days of hospital admission (age 50+)**
Tracer	Stroke
Numerator or calculation	For the inpatient admissions in the denominator: (Sum of) Dummy for whether the patient was discharged by day of admission +56
Denominator or set of people for whom to calculate	Number of hospital admissions for which the admission diagnostic code includes a stroke code and for which the patient year of birth <= year of admission-50
Source of data 1	Inpatient admissions: inpatient movement data
Source of data 2	Inpatient discharges: Inpatient movement data
Diagnosis and manipulation codes	See diagnosis codes in the diagnosis codes sheet
Outstanding issues	Of the patients that were discharged with a stroke code, only 56 percent had a stroke code at admission
Notes	This indicator uses a cleaned up version of the inpatient episode ifnromation. About 3% of stroke related episodes were dropped due to inconsistent discharge date and/or code information.
References	

Status	DONE
Indicator Nr	**C01**
Indicator	**% of women aged 20 and older receiving annual well check, separately by year.**
Tracer	Breast cancer
Numerator or calculation	Women who turned 20+ in year t-1 receiving general health check or ob/gyn cancer screening in year t
Denominator or set of people for whom to calculate	Women aged 20+ in t-1
Source of data 1	NHS outpatient databases: - outpatient record database for diagnosis codes, and manipulation database for manipulation codes.
Source of data 2	Women database
Diagnosis and manipulation codes	Manipulation codes: general health checks and ob/gyn screenings in screening exams. The following manipulation codes were excluded: 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. Diagnosis codes: All wellness codes except for cervical smear and eye exam. A new wellness condition was defined and coded as wellnessbc_precise "Z00 Z00.0 Z00.00 Z00.01 Z00.8 Z01" global wellnessbc_bucket "Z01.3 Z01.4 Z01.41" within the do file

Outstanding issues	
Notes	Compute for 2009 -2014. We excluded women aged 99+ (around 0.01% of total women aged 20+) 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 separately into the records database (to look for diagnosis codes) and the manipulations database (to look for manipulation codes). The data available excludes well checks that were privately financed.
References	

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	**C03_1**
Indicator	**% of women sent a mammogram invitation letter in year t (i) who receive a mammogram 12 months after the sending of the letter (ii) who receive a mammogram 12 months before the sending of the letter (iii) who do not receive a mammogram 12 months before or 12 months after the 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 (i) d+12 months, (ii)by d-12 months, or (iii) who do not receive a mammogram by d+12 months or 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	Database of letters for breast cancer screening
Diagnosis and manipulation codes	Manipulation codes: Mammography in other diagnostics
Outstanding issues	
Notes	Compute for 2010-2013. Categories of the indicator should add up to 100%. 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 diagnosis 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	**C06**
Indicator	**% of initial diagnoses occuring in place p= outpatient, inpatient, SEMS, postmortem setting, separately by year.**
Tracer	Breast cancer
Numerator or calculation	First diagnosis breast cancer cases in place p in year t, conditional on not having the same diagnosis in the previous 24 months
Denominator or set of people for whom to calculate	First diagnosis breast cancer cases in year t, conditional on not having the same diagnosis 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	
Diagnosis and manipulation codes	Diagnosis: breastcancer confirmed
Outstanding issues	
Notes	Compute for 2011-2014. Years 2009 and 2010 are missing because we need 24 month lead to initial diagnosis . If patients go to non-NHS paid services for diagnosis/biopsy, they might show up for the first time in NHS records with a cancer diagnosis at the time of treatment.
References	

Status	DONE
Indicator Nr	**C07**
Indicator	**Fraction of initial diagnoses in NHS data, with treatment within 21 days of diagnosis, per year.**
Tracer	Breast cancer
Numerator or calculation	Initial diagnoses in NHS data in year t, conditional on not having the same diagnosis in the previous 24 months, that have treatment within 21 days in inpatient or outpatient records
Denominator or set of people for whom to calculate	Initial diagnoses in NHS data in year t, conditional on not having the same diagnosis 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	NHS inpatient and outpatient data: records and manipulations
Diagnosis and manipulation codes	Diagnosis: breastcancer confirmed Manipulations that should come toghether are observed with extremely low frequency (60110 50300) (60110 50301) (60110 50302) (60110 50303) We used all breast chemo codes, radiation codes, 60008, Breast sectoral resection, Radical mastectomy, needle ablation of tumor.
Outstanding issues	
Notes	Compute for 2011-2014. Years 2009 and 2010 are missing because we need 24 month lead to initial diagnosis . For inpatient manipulation (tab3) start_date_manipulation has been used instead of date of movement
References	

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 diagnosis 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	**C08_1**
Indicator	**Number of visits to an oncologist or other cancer specialist within 30, 31-60, 61-90, 91-365 days after initial diagnosis, separately by year**
Tracer	Breast cancer
Numerator or calculation	Among patients in the demominator: sum the number of outpatient visit (include zero visit) with a cancer specialist within 30, 31-60, 61-90, 91-365 days of the initial diagnosis date. Create the average of total number of visits within 30, 31-60, 61-90,
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 diagnosis 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. We only know the start and end date of the episodes and the number of visits within each episode, not the dates of the actual visits. 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 diagnosis 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 diagnosis 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 diagnosis 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	**C09_1**
Indicator	**% of patients with initial diagnosis of confirmed breast cancer who received a treatment within 12 months after diagnosis, separately by year.**
Tracer	Breast cancer
Numerator or calculation	Number of patients with confirmed breast cancer confirmed who received treatment within a year after diagnosis. Onset of treatment: Start date of first inpatient or outpatient record that includes a manipulation code for treatment Date of diagnosis: fir
Denominator or set of people for whom to calculate	People with diagnosis code of breast cancer confirmed in year t, conditional on not having the same diagnosis in the previous 24 months and on not having the diagnosis date coincide with date of inpatient or outpatient treatment manipulation.
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.
References	

Status	**DONE**
Indicator Nr	**C10_cr**
Indicator	**: Percentage of women with diagnosis of Stage I, II or III confirmed breast cancer who underwent a sentinel lymph node biopsy or axillary lymph node dissection (i) 0 to 3 months after the diagnosis, (ii) 3 to 12 months after the diagnosis, (iii) more than 12 months after the diagnosis, (iv) 0-3 months before the diagnosis, (v) 3-12 months before the diagnosis, and (vi) more than 12 months before the diagnosis, separately by year.**
Tracer	Breast cancer
Numerator or calculation	Women with diagnosis of Stage I, II or III confirmed breast cancer confirmed in year t who underwent a sentinel lymph node biopsy or axillary lymph node dissection (i) 0 to 3 months after the diagnosis, (ii) 3 to 12 months after the diagnosis, (iii) more
Denominator or set of people for whom to calculate	Women with diagnosis of Stage I, II or III breast cancer in year t, as per diagnosis date reported in Cancer Registry
Source of data 1	Staging: Cancer registry Procedures: outpatient manipulation data, inpatient manipulation data.
Source of data 2	Date of diagnosis: cancer ragistry database.
Diagnosis and manipulation codes	Manipulation codes: under other diagnostics
Outstanding issues	About 10% to 30% of patients seem to receive a treatment before a diagnosis (by using date of diagnosis reported in the cancer registry).
Notes	Compute for 2010-2013. 2009 and 2014 are missing because we need 12 month (before and after) lead to initial diagnosis . In addition, cancer registry dataset for 2014 is incomplete. Excludes diagnoses made through the death registry. We excluded observations with missing values in stage variable. For cases with more than one stage, we took minimum stage. For patients with more than one relevant manipulation code, we considered as valid the first time the person underwent a sentinel lymph node biopsy or axillary lymph node dissection. We reported 3 indicators - one indicator for each stage. Categories of the indicator should add up to 100%. Date of diagnosis data comes from cancer registry.
References	

Status	**DONE**
Indicator Nr	**C10_nhs** **(to be reported instead of C10_cr)**
Indicator	**% of women with diagnosis of Stage I, II or III confirmed breast cancer who underwent a sentinel lymph node biopsy or axillary lymph node dissection (i) 0 to 3 months after the diagnosis, (ii) 3 to 12 months after the diagnosis, (iii) more than 12 months after the diagnosis, (iv) 0-3 months before the diagnosis, (v) 3-12 months before the diagnosis, and (vi) more than 12 months before the diagnosis, separately by year.**
Tracer	Breast cancer
Numerator or calculation	Women with diagnosis of Stage I, II or III confirmed breast cancer confirmed in year t who underwent a sentinel lymph node biopsy or axillary lymph node dissection (i) 0 to 3 months after the diagnosis, (ii) 3 to 12 months after the diagnosis, (iii) more
Denominator or set of people for whom to calculate	Women with diagnosis of Stage I, II or III breast cancer in year t, as per diagnosis date reported in NHS data.
Source of data 1	Staging: Cancer registry Procedures: outpatient manipulation data, inpatient manipulation data.
Source of data 2	Date of diagnosis: constructed database of people with dates of diagnosis
Diagnosis and manipulation codes	Manipulation codes: under other diagnostics Diagnosis: breastcancer confirmed main.
Outstanding issues	About 2 % to 7% of the observations has a date of treatment before the date of first diagnosis (depending on the year and the stage analyzed).
Notes	Compute for 2010-2013. 2009 and 2014 are missing because we need 12 month (before and after) lead to initial diagnosis . In addition, cancer registry dataset for 2014 is incomplete. Excludes diagnoses made through the death registry. We excluded observations with missing values in stage variable. For cases with more than one stage, we took minimum stage. For patients with more than one relevant manipulation code, we considered as valid the first time the person underwent a sentinel lymph node biopsy or axillary lymph node dissection. We reported 3 indicators - one indicator for each stage. Categories of the indicator should add up to 100%.
References	

Appendix 3:

Status	**DONE**
Indicator Nr	**C12**
Indicator	**Location of breast cancer patient deaths (hospital, home, hospice, other)**
Tracer	Breast cancer
Numerator or calculation	Number of deaths where the diagnosis code for cause of death is C50(bucket) in the death registry [diag_code_cause_death] , by location L [place_death], in year t
Denominator or set of people for whom to calculate	Number of deaths where the diagnosis code for cause of death is C50 (bucket) in the death registry, in year t
Source of data 1	Death registry
Source of data 2	
Diagnosis and manipulation codes	Diagnosis: breastcancer confirmed main
Outstanding issues	
Notes	Compute for 2009-2014. Categories of the indicator should add up to 100%. Cases with missing values in death year or place of death were excluded from the analysis (0.5% of total deaths)
References	

Status	**DONE**
Indicator Nr	**C13**
Indicator	**For inpatient deaths: Percentage of days spent as inpatient in the 30/60/90 days prior to death**
Tracer	Breast cancer
Numerator or calculation	For the patients in the denominator: number of days spent as an inpatient within the 30/60/90 days before death, divided by 30/60/90
Denominator or set of people for whom to calculate	Number of patients who died in the hospital and had a breast cancer diagnosis code in the "dead" movement
Source of data 1	NHS inpatient records and movements for breast cancer patients
Source of data 2	
Diagnosis and manipulation codes	Diagnosis: breastcancer confirmed main
Outstanding issues	This is complicated to compute: many admissions are not real admissions but correspond to a fictitious checkout - however, in the data there is no link between the fictitious checkout and the ensuing fictitious admission
Notes	Compute for 2009-2014. We identified those ipr where one of the movements activity code is "dead". We also identified those movement records that are for a person who eventually died and that are within 30/60/90 days of death.

	Per patient: we count the number of admissions (as in code_movement admissions) minus the number of fictitious checkouts. This is because after a fictitious checkout, there is an admission which is not coded as a fictitious admission but rather as a regular admission. If patient admission is the same day of death, is count as 1 day.
References	

Status	**DONE**
Indicator Nr	**C13_1**
Indicator	**For inpatient deaths: Average length of stay (in days) in the hospital within 30/60/90 days prior to death**
Tracer	Breast cancer
Numerator or calculation	Number of days spent as an inpatient within the 30/60/90 days before death
Denominator or set of people for whom to calculate	Number of patients who died in the hospital and had a breast cancer diagnosis code in the "dead" movement
Source of data 1	NHS inpatient records and movements for breast cancer patients
Source of data 2	
Diagnosis and manipulation codes	Diagnosis: breastcancer confirmed main
Outstanding issues	This is complicated to compute: many admissions are not real admissions but correspond to a fictitious checkout - however, in the data there is no link between the fictitious checkout and the ensuing fictitious admission
Notes	Compute for 2009-2014. We identified those ipr where one of the movements activity code is "dead". We also identified those movement records that are for a person who eventually died and that are within 30/60/90 days of death. Per patient: we count the number of admissions (as in code_movement admissions) minus the number of fictitious checkouts. This is because after a fictitious checkout, there is an admission which is not coded as a fictitious admission but rather as a regular admission. If patient admission is the same day of death, is count as 1 day.
References	

Status	DONE
Indicator Nr	**C14**
Indicator	**For inpatient deaths: Number of inpatient admissions in the 30/60/90 days prior to death**
Tracer	Breast cancer
Numerator or calculation	For the patients in the denominator: number of admissions as an inpatient within the 30/60/90 days before death. (see notes for the method of calculation)
Denominator or set of people for whom to calculate	Number of patients who died in the hospital and had a breast cancer diagnosis code in the "dead" movement
Source of data 1	NHS inpatient records and movements for breast cancer patients
Source of data 2	
Diagnosis and manipulation codes	Diagnosis: breastcancer confirmed main
Outstanding issues	This is complicated to compute: many admissions are not real admissions but correspond to a fictitious checkout - however, in the data there is no link between the fictitious checkout and the ensuing fictitious admission.
Notes	Compute for 2009-2014. We identified those ipr where one of the movements activity code is "dead". We also identified those movement records that are for a person who eventually died and that are within 30/60/90 days of death. Per patient: we count the number of admissions (as in code_movement admissions) minus the number of fictitious checkouts. This is because after a fictitious checkout, there is an admission which is not coded as a fictitious admission but rather as a regular admission. If patient admission is the same day of death, is count as 1 day.
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 diagnosis 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	**C19**
Indicator	**% of initial diagnoses occuring in place p= outpatient, inpatient, SEMS, postmortem setting, separately by year**
Tracer	Cervical cancer
Numerator or calculation	First diagnosis cervical cancer cases in place p in year t, conditional on not having the same diagnosis in the previous 24 months
Denominator or set of people for whom to calculate	First diagnosis cervical cancer cases in year t, conditional on not having the same diagnosis 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	
Diagnosis and manipulation codes	Diagnosis: cervical cancer confirmed
Outstanding issues	If patients go to non-NHS paid services for diagnosis/biopsy, they might show up for the first time in NHS records with a cancer diagnosis at the time of treatment.
Notes	Compute for for 2011-2014. Years 2009 and 2010 are missing because we need 24 month lead to initial diagnosis .
References	

Status	DONE
Indicator Nr	**C20**
Indicator	**Number of cancer visits to an oncologist or other cancer specialist within 30, 31-60, 61-90, 91-365 days and total number of visits within 365 days**
Tracer	Cervical cancer
Numerator or calculation	Among patients in the demominator: sum the number of outpatient visit (include zero visit) with a cancer specialist within 30, 31-60, 61-90, 91-365 days of the initial diagnosis date.Create the average of total number of visits within 30, 31-60, 61-90, 9
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 diagnosis in the previous 24 months.
Source of data 1	Outpatient episode data for cervical cancer, inpatient case data for cervical cancer, specialist list for cervical cancer
Source of data 2	
Diagnosis and manipulation codes	Diagnosis: cervical cancer 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. We only know the start and end date of the episodes and the number of visits within each episode, not the dates of the actual visits. This indicator is calculated in outpatient visits settings only.
References	

Status	DONE
Indicator Nr	**C21**
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	Cervical 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 diagnosis in the previous 24 months.
Source of data 1	Constructed database on patients with dates of diagnosis and source of data. Outpatient record data for cancer patients, specialist list for cancer
Source of data 2	
Diagnosis and manipulation codes	Diagnosis: cervical cancer 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	**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 diagnosis 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 diagnosis 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	**C22_1**
Indicator	**Proportion of patients with initial confirmed diagnosis of cervical cancer who received a treatment after diagnosis**
Tracer	Cervical cancer
Numerator or calculation	Number of patients with this cancer confirmed that receieved treatment after diagnosis. 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
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 diagnosis 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	**C23**
Indicator	**Location of cervical cancer patient deaths (hospital, home, hospice, other)**
Tracer	Cervical cancer
Numerator or calculation	Number of deaths where the diagnosis code for cause of death is cervical cancer in the death registry [diag_code_cause_death] , by location L [place_death], in year t
Denominator or set of people for whom to calculate	Number of deaths where the diagnosis code for cause of death is cervical cancer conf in the death registry, in year t
Source of data 1	Death registry
Source of data 2	
Diagnosis and manipulation codes	Diagnosis: cervical cancer confirmed main
Outstanding issues	
Notes	Compute for 2009-2014. Cases with missing values in death year or place of death were excluded from the analysis (less than 0.5% of total deaths) Categories of the indicator should add up to 100%.
References	

Status	DONE
Indicator Nr	**C24**
Indicator	**For inpatient deaths: average length of inpatient stay (in days) in the 30/60/90 days prior to death**
Tracer	Cervical cancer
Numerator or calculation	Number of days spent as an inpatient within the 30/60/90 days before death
Denominator or set of people for whom to calculate	Number of patients who died in the hospital and had a cervical cancer diagnosis code in the "dead" movement
Source of data 1	NHS inpatient records and movements for breast cancer patients
Source of data 2	
Diagnosis and manipulation codes	Diagnosis: cervical cancer confirmed main
Outstanding issues	This is complicated to compute: many admissions are not real admissions but correspond to a fictitious checkout - however, in the data there is no link between the fictitious checkout and the ensuing fictitious admission
Notes	Compute for for 2009-2014. we identified those ipr where one of the movements activity code is "dead". We also identified those movement records that are for a person who eventually died and that are within 30/60/90 days of death. Per

	patient: count the number of admissions (as in code_movement admissions) MINUS the number of fictitious checkouts. This is because after a fictitious checkout, there is an admission which is NOT coded as a fictitious admission but rather as a regular admission. If patient admission is the same day of death, is count as 1 day.
References	

Status	**DONE**
Indicator Nr	**C24_1**
Indicator	**For inpatient deaths: Number of inpatient admissions in the 30/60/90 days prior to death**
Tracer	Cervical cancer
Numerator or calculation	For the patients in the denominator: number of admissions as an inpatient within the 30/60/90 days before death. (see notes for the method of calculation)
Denominator or set of people for whom to calculate	Number of patients who died in the hospital and had a cervical cancer diagnosis code in the "dead" movement
Source of data 1	NHS inpatient records and movements for cervical cancer patients
Source of data 2	
Diagnosis and manipulation codes	Diagnosis: cervical cancer confirmed main
Outstanding issues	
Notes	Compute for for 2009-2014. we identified those ipr where one of the movements activity code is "dead". We also identified those movement records that are for a person who eventually died and that are within 30/60/90 days of death. Per patient: count the number of admissions (as in code_movement admissions) MINUS the number of fictitious checkouts. This is because after a fictitious checkout, there is an admission which is NOT coded as a fictitious admission but rather as a regular admission.
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	
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 diagnosis 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.
References	Benchmark countries are: Canada (42.5%) Denmark (36.4%) Normway (19.4%) Sweden (47.1%) UK (47.1%) Source: http://www.ncbi.nlm.nih.gov/pubmed/23581611

Status	**DONE**
Indicator Nr	**C28**
Indicator	**For each cancer tracer: % of initial diagnoses occuring in outpatient, inpatient, SEMS, postmortem settings**
Tracer	Colorectal cancer
Numerator or calculation	First diagnosis colorectal cancer cases in place p in year t, conditional on not having the same diagnosis in the previous 24 months
Denominator or set of people for whom to calculate	First diagnosis colorectal cancer cases in year t, conditional on not having the same diagnosis 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	
Diagnosis and manipulation codes	Diagnosis: colorectal cancer confirmed
Outstanding issues	If patients go to non-NHS paid services for diagnosis/biopsy, they might show up for the first time in NHS records with a cancer diagnosis at the time of treatment.
Notes	Compute for for 2011-2014. Years 2009 and 2010 are missing because we need 24 month lead to initial diagnosis .
References	

Status	DONE
Indicator Nr	**C29**
Indicator	**Number of visits to an oncologist or other cancer specialist within 30/60/90/365 days or no visits within a year after diagnosis, separately by year**
Tracer	Colorectal cancer
Numerator or calculation	Among patients in the demominator: sum the number of outpatient visit (include zero visit) with a cancer specialist within 30/60/90/365 days of the initial diagnosis date.Create the average of total number of visits within 30/60/90/365 days
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 diagnosis in the previous 24 months.
Source of data 1	Outpatient episode data for colorectal cancer, inpatient case data for colorectal cancer, specialist list for colorectal cancer
Source of data 2	
Diagnosis and manipulation codes	Diagnosis: colorectal cancer 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. We only know the start and end date of the episodes and the number of visits within each episode, not the dates of the actual visits. This indicator is calculated in outpatient visits settings only.
References	

Status	DONE
Indicator Nr	**C30**
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	Colorectal 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 diagnosis in the previous 24 months.
Source of data 1	Constructed database on patients with dates of diagnosis and source of data. Outpatient record data for cancer patients, specialist list for cancer
Source of data 2	
Diagnosis and manipulation codes	Diagnosis: colorectal cancer 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	**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 diagnosis 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 diagnosis 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	**C31_1**
Indicator	**Proportion of patients with first diagnosis of this cancer confirmed who received a treatment after diagnosis**
Tracer	Colorectal cancer
Numerator or calculation	Number of patients with this cancer confirmed that receieved treatment after diagnosis. 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
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 diagnosis 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	**C32**
Indicator	**For inpatient deaths: average length of inpatient stay (in days) in the 30/60/90 days prior to death**
Tracer	Colorectal cancer
Numerator or calculation	Number of days spent as an inpatient within the 30/60/90 days before death
Denominator or set of people for whom to calculate	Number of patients who died in the hospital and had a cervical cancer diagnosis code in the "dead" movement
Source of data 1	NHS inpatient records and movements for breast cancer patients
Source of data 2	
Diagnosis and manipulation codes	Diagnosis: colorectal cancer confirmed

Outstanding issues	This is complicated to compute: many admissions are not real admissions but correspond to a fictitious checkout - however, in the data there is no link between the fictitious checkout and the ensuing fictitious admission
Notes	Compute for for 2009-2014. we identified those ipr where one of the movements activity code is "dead". We also identified those movement records that are for a person who eventually died and that are within 30/60/90 days of death. Per patient: count the number of admissions (as in code_movement admissions) MINUS the number of fictitious checkouts. This is because after a fictitious checkout, there is an admission which is NOT coded as a fictitious admission but rather as a regular admission. If patient admission is the same day of death, is count as 1 day.
References	

Status	**DONE**
Indicator Nr	**C32_1**
Indicator	**For inpatient deaths: Number of inpatient admissions in the 30/60/90 days prior to death**
Tracer	Colorectal cancer
Numerator or calculation	For the patients in the denominator: number of admissions as an inpatient within the 30/60/90 days before death. (see notes for the method of calculation)
Denominator or set of people for whom to calculate	Number of patients who died in the hospital and had a colorectal cancer diagnosis code in the "dead" movement
Source of data 1	NHS inpatient records and movements for colorectal cancer patients
Source of data 2	
Diagnosis and manipulation codes	Diagnosis: colorectal cancer confirmed
Outstanding issues	This is complicated to compute: many admissions are not real admissions but correspond to a fictitious checkout - however, in the data there is no link between the fictitious checkout and the ensuing fictitious admission
Notes	Compute for for 2009-2014. we identified those ipr where one of the movements activity code is "dead". We also identified those movement records that are for a person who eventually died and that are within 30/60/90 days of death. Per patient: count the number of admissions (as in code_movement admissions) MINUS the number of fictitious checkouts. This is because after a fictitious checkout, there is an admission which is NOT coded as a fictitious admission but rather as a regular admission. If patient admission is the same day of death, is count as 1 day.
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 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 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	**M7**
Indicator	**# of inpatient days per year, conditional on depression diagnosis**
Tracer	Depression
Numerator or calculation	For people in the denominator: Number of ambulance 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 depression in year t, as per any NHS or SEMS database.
Source of data 1	Numerator: Inpatient days: NHS inpatient payment data with substantial processing to fix records
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	The denominator excludes cases where the depression diagnosis was only made in the death registry.
References	

Status	**DONE**
Indicator Nr	**M12**
Indicator	**# of inpatient days per year, conditional on substance abuse diagnosis**
Tracer	Substance abuse
Numerator or calculation	For people in the denominator: 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	Inpatient days: NHS inpatient payment data with substantial processing to fix records
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	The denominator excludes cases where the substance abuse diagnosis was only made in the death registry.
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 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	**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	**M9**
Indicator	**# of SEMS call per year, conditional on depression diagnosis**
Tracer	Depression
Numerator or calculation	For people in the denominator: Number of ambulance 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 depression in year t, as per any NHS or SEMS database.
Source of data 1	Numerator: SEMS calls: SEMS 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	The denominator excludes cases where the depression diagnosis was only made in the death registry.
References	

Status	**DONE**
Indicator Nr	**M14**
Indicator	**# of SEMS call per year, conditional on substance abuse diagnosis**
Tracer	Substance abuse
Numerator or calculation	For people in the denominator: 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	Numerator: SEMS calls: SEMS data
Source of data 2	Denominator: Diagnosis ofsubstance 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	The denominator excludes cases where the substance abuse diagnosis was only made in 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	**M36**
Indicator	**Death from suicide within 1 year after discharge among patients discharged alive with a with mental disease code who were alive at time of discharge**
Tracer	self harm
Numerator or calculation	For people in the denominator: Number of suicides: are counted as suicides those deaths registered in the death registry with a selfharm code within 365 days, as well as patients who were admitted as inpatient with a self-harm code and were discharged dea
Denominator or set of people for whom to calculate	Number of people over the age of 15 with inpatient discharge for which the discharge diagnostic codes include a self-harm code or a mental disease code. Include only discharges to home. For patients that had several such inpatient discharges, include only
Source of data 1	Numerator: Suicides: death registry and NHS inpatient movement data
Source of data 2	Denominator: Inpatient discharges: Inpatient movement data
Diagnosis and manipulation codes	See diagnosis codes in the diagnosis codes sheet
Outstanding issues	
Notes	OECD mental health indicator. Note that there is significant undercoding of mental illness for persons that were admitted or dicharged with a selfharm diagnosis. WB calculated indicator adjustS for this AND includes all discharge codes (not only the first
References	

Status	DONE
Indicator Nr	**M37**
Indicator	**Death from suicide within 30 days after discharge among patients discharged with a mental disease code who were alive at time of discharge**
Tracer	self harm
Numerator or calculation	For patients in the denominator: Number of suicides: are counted as suicides those deaths registered in the death registry with a selfharm code within 30 days, as well as patients who were admitted as inpatient with a self-harm code and were discharged de
Denominator or set of people for whom to calculate	Number of people over the age of 15 with inpatient discharge for which the discharge diagnostic codes include a self-harm code or a mental disease code. Include only discharges to home. For patients that had several such inpatient discharges, include only
Source of data 1	Numerator: Suicides: death registry and NHS inpatient movement data
Source of data 2	Denominator: Inpatient discharges: Inpatient movement data
Diagnosis and manipulation codes	See diagnosis codes in the diagnosis codes sheet
Outstanding issues	--
Notes	OECD mental health indicator. Note that there is significant undercoding of mental illness for persons that were admitted or dicharged with a selfharm

	diagnosis. WB calculated indicator adjustS for this AND includes all discharge codes (not only the first
References	

Status	**DONE**
Indicator Nr	**M29**
Indicator	**Fraction of hospitalizations with a substance abuse diagnosis that had a mental health specialist visit in 12 months prior to admission.**
Tracer	Substance abuse
Numerator or calculation	Among hospitalization episodes in the denominator: Number of episodes for which the patient had a mental health specialist visit in the 365 days before admission.
Denominator or set of people for whom to calculate	Number of hospitalization episodes for which either admission or discharge diagnostic codes include substance abuse code; inpatient admission date falls within the year of reference; excludes inpatient episodes that correspond to readmission after fictiti
Source of data 1	Inpatient episodes and outpatient visits: NHS inpatient and outpatient payment data
Source of data 2	Mental health specialists: specialist database
Diagnosis and manipulation codes	See diagnosis codes in the diagnosis codes sheet
Outstanding issues	
Notes	This is complicated to compute: many admissions are not real admissions but correspond to a fictitious checkout - however, in the data there is no link between the fictitious checkout and the ensuing fictitious admission
References	

Status	**DONE**
Indicator Nr	**M32**
Indicator	**Fraction of hospitalizations with a self harm diagnosis that had a mental health specialist visit in 12 months prior to admission.**
Tracer	self harm
Numerator or calculation	Among hospitalization episodes in the denominator: number of episodes for which the patient had a mental health specialist visit in the 365 days before admission.
Denominator or set of people for whom to calculate	Number of hospitalization episodes for which either admission or discharge diagnostic codes include self-harm code; inpatient admission date falls within the year of reference; excludes inpatient episodes that correspond to readmission after fictitious c
Source of data 1	Inpatient episodes and outpatient visits: NHS inpatient and outpatient payment data
Source of data 2	Mental health specialists: specialist database
Diagnosis and manipulation codes	See diagnosis codes in the diagnosis codes sheet
Outstanding issues	

Notes	This is complicated to compute: many admissions are not real admissions but correspond to a fictitious checkout - however, in the data there is no link between the fictitious checkout and the ensuing fictitious admission
References	

Status	**DONE**
Indicator Nr	**M25**
Indicator	**Fraction of hospitalizations with a depression diagnosis that had a primary care visit in 12 months prior to admission**
Tracer	Depression
Numerator or calculation	Among hospitalization episodes in the denominator: number of episodes for which the patient had a gp visit in the 365 days before admission.
Denominator or set of people for whom to calculate	Hospitalization episodes for which either admission or discharge diagnostic codes include depression; inpatient admission date falls within the year of reference; excludes inpatient episodes that correspond to readmission after fictitious checkout.
Source of data 1	Inpatient episodes and outpatient visits: NHS inpatient and outpatient payment data
Source of data 2	Primary care physicians: specialist database
Diagnosis and manipulation codes	See diagnosis codes in the diagnosis codes sheet
Outstanding issues	
Notes	This is complicated to compute: many admissions are not real admissions but correspond to a fictitious checkout - however, in the data there is no link between the fictitious checkout and the ensuing fictitious admission
References	

Status	**DONE**
Indicator Nr	**M28**
Indicator	**Fraction of hospitalizations with a substance abuse diagnosis that had a primary care visit in 12 months prior to admission**
Tracer	Substance abuse
Numerator or calculation	Among hospitalization episodes in the denominator: Number of episodes for which the patient had a gp visit in the 365 days before admission.
Denominator or set of people for whom to calculate	Number of hospitalization episodes for which either admission or discharge diagnostic codes include substance abuse code; inpatient admission date falls within the year of reference; excludes inpatient episodes that correspond to readmission after fictiti
Source of data 1	Inpatient episodes and outpatient visits: NHS inpatient and outpatient payment data
Source of data 2	Primary care physicians: specialist database
Diagnosis and manipulation codes	See diagnosis codes in the diagnosis codes sheet
Outstanding issues	

Notes	This is complicated to compute: many admissions are not real admissions but correspond to a fictitious checkout - however, in the data there is no link between the fictitious checkout and the ensuing fictitious admission
References	

Status	**DONE**
Indicator Nr	**M31**
Indicator	**Fraction of hospitalizations with a self harm diagnosis that had a primary care visit in 12 months prior to admission**
Tracer	self harm
Numerator or calculation	Among hospitalization episodes in the denominator: Number of episodes for which the patient had a gp visit in the 365 days before admission.
Denominator or set of people for whom to calculate	Number of hospitalization episodes for which either admission or discharge diagnostic codes include self-harm code; inpatient admission date falls within the year of reference; excludes inpatient episodes that correspond to readmission after fictitious c
Source of data 1	Inpatient episodes and outpatient visits: NHS inpatient and outpatient payment data
Source of data 2	Primary care physicians: specialist database
Diagnosis and manipulation codes	See diagnosis codes in the diagnosis codes sheet
Outstanding issues	
Notes	This is complicated to compute: many admissions are not real admissions but correspond to a fictitious checkout - however, in the data there is no link between the fictitious checkout and the ensuing fictitious admission
References	

Status	**DONE**
Indicator Nr	**M26**
Indicator	**Fraction of hospitalizations with a depression diagnosis that had a specialist visit in 12 months prior to admission.**
Tracer	Depression
Numerator or calculation	Among hospitalization episodes in the denominator: number of episodes for which the patient had a mental health specialist visit in the 365 days before admission.
Denominator or set of people for whom to calculate	Hospitalization episodes for which either admission or discharge diagnostic codes include depression; inpatient admission date falls within the year of reference; excludes inpatient episodes that correspond to readmission after fictitious checkout.
Source of data 1	Inpatient episodes and outpatient visits: NHS inpatient and outpatient payment data
Source of data 2	Mental health specialists: specialist database
Diagnosis and manipulation codes	See diagnosis codes in the diagnosis codes sheet
Outstanding issues	
Notes	This is complicated to compute: many admissions are not real admissions but correspond to a fictitious checkout - however, in the data there is no link between the fictitious checkout and the ensuing fictitious admission
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	

Status	DONE
Indicator Nr	**M30**
Indicator	**Timing of the first follow-up visit with a mental health specialist for discharges with a self harm diagnosis (within 30days, within 31-60 days, within 61-90 days, none within 90 days)**
Tracer	self harm
Numerator or calculation	For the inpatient discharges in the denominator: (Sum of) Dummy for whether the person discharged had a 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 inpatient discharges for which the discharge diagnostic codes include a self-harm 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	

Status	DONE
Indicator Nr	**MP0**
Indicator	**% of pregnant women who sought care through NHS outpatient services within 42 weeks before delivery, among women age 15-49 who had a live birth occurring in year t**
Tracer	
Numerator or Calculation	Among pregnant women in the denominator: Number of women seeking (any) care through NHS outpatient service within 42 weeks before delivery.
Denominator or set of people for whom to calculate	Preganant women aged 15-49 with a live birth in year t register in the CDPC new born list.
Source of data 1	CDPC Newborn registry
Source of data 2	NHS outpatient and manipulation data
Diagnosis and manipulation codes	
Outstanding issues	
Notes	Compute for 2010-2014. The following cases were excluded from the analysis: (a) pregnant women without PID in the CDPC new born register; (b) pregnancy ending in a baby death / still birth,(C) pregnant women aged more than 49 or less than 15. Those manipulation codes related to pregnancy that happend to a woman before 9 months within delivery.(that is, 295 days or more from the date of

	delivery were not count into the numerator. Note that in day 295, we have high frequent women with manipulation code related to radiology.
References	

Status	**DONE**
Indicator Nr	**MP1**
Indicator	**Average number of prenatal care visits in pregnant women aged 15–49 who had a live birth occurring in year t and sought care through contracted services**
Tracer	High-risk pregnancy
Numerator or Calculation	For women in the denominator: average number of prenatal care visits
Denominator or set of people for whom to calculate	Number of pregnant women aged 15–49 who had a live birth occurring in year t and received at least one NHS service within 42 weeks before delivery.
Source of data 1	CDPC Newborn registry
Source of data 2	NHS outpatient and manipulation dataset
Diagnosis and manipulation codes	Prenatal care visits includes: *OB/GYN care of pregnant woman (manipulation code: 01070) *Midwives care of pregnant woman (manipulation code: 01029) *Family Doctor's care of pregnant woman (manipulation code 01062)
Outstanding issues	
Notes	Compute for 2010-2014. Prenatal care visits is equal zero for those women without prenatal care manipulation codes registered. For birth registry: check how/when the information is filled in, and what sources of informaiton are used (patient chart? Pregnancy passport?)
References	http://data.unicef.org/maternal-health/antenatal-care.html http://www.who.int/whosis/whostat2006AntenatalCareCoverage.pdf

Status	**DONE**
Indicator Nr	**MP2**
Indicator	**% of pregnant women who received first prenatal care during the first trimester, conditional on seeking care through contracted services**
Tracer	High-risk pregnancy
Numerator or Calculation	Among pregnant women in the denominator: Number of pregnant women who had a prenatal care visit in week 12 or before.
Denominator or set of people for whom to calculate	Pregnant women aged 15–49 who had a live birth occurring in year t and received at least one NHS service within 42 weeks before delivery.
Source of data 1	CDPC Newborn registry
Source of data 2	NHS outpatient and manipulation dataset
Diagnosis and manipulation codes	Prenatal care visits includes: *OB/GYN care of pregnant woman (manipulation code: 01070) *Midwives care of pregnant woman (manipulation code: 01029)

	*Family Doctor's care of pregnant woman (manipulation code 01062)
Outstanding issues	
Notes	Compute for 2010-2014.
References	

Status	**DONE**
Indicator Nr	**MP3_Itrim**
Indicator	**% of pregnant women receiving an ultrasound in first trimester, conditional on seeking care through contracted services**
Tracer	High-risk pregnancy
Numerator or Calculation	Among pregnant women in the denominator: Number of pregnant women receiving an ultrasound in week 12 of pregnancy or before.
Denominator or set of people for whom to calculate	Pregnant women aged 15–49 who had a live birth occurring in year t and received at least one NHS service within 42 weeks before delivery.
Source of data 1	CDPC Newborn registry
Source of data 2	NHS outpatient and manipulation data
Diagnosis and manipulation codes	Ultrasound examination with folds withers measurements including the amortization of the ultrasound machine (manipulation code: 50694). Hide together with manipulation 50695, 50740, 50741, 50742. Ultrasound examination in obstetrics, including the amortization of the ultrasound machine (manipulation code: 50695). Hide together with manipulation 50694, 50740,50741, 50742 Musculoskeletal ultrasonography (manipulation code: 50697)
Outstanding issues	
Notes	Compute for 2010-2014. Trimesters are counted from the first day of the last menstrual period. First trimester is less than 14 weeks 0 day of gestation by the time of the service was provided. Week of gestation by the time the service was provided is calculated based on date of baby birth, gestational weeks at birth and date of service provided (start date of AD in NHS dataset), that is: Week of gestation by the time the service = [Gestational weeks at birth] - [(Date of baby birth – date of service provided)/7 days]. Figures for 2014 are always higher for all ultrasound indicators compared to any other year. Note that manipulation code 50694 and 50695 are registered with low frequency except for 2014. Manipulation 50697 (musculoskeletal ultrasonography) is registered more oftern from 2010 to 2013. CDPC source cannot be used as there is no data on ultrasound for years 2010 to 2012.
References	

Status	**DONE**
Indicator Nr	**MP3_IItrim**
Indicator	**% of pregnant women receiving an ultrasound in second trimester, conditional on seeking care through contracted services**
Tracer	High-risk pregnancy
Numerator or Calculation	Among pregnant women in the denominator: Number of pregnant women receiving an ultrasound between week 13 and week 24 of pregnancy.
Denominator or set of people for whom to calculate	Pregnant women aged 15–49 who had a live birth occurring in year t and received at least one NHS service within 42 weeks before delivery.
Source of data 1	CDPC Newborn registry
Source of data 2	NHS outpatient and manipulation data
Diagnosis and manipulation codes	Ultrasound examination in obstetrics, including the amortization of the ultrasound machine (manipulation code: 50695). Hide together with manipulation 50694, 50740,50741, 50742 Musculoskeletal ultrasonography (manipulation code: 50697)
Outstanding issues	
Notes	Compute for 2010-2014. Trimesters are counted from the first day of the last menstrual period. Second trimester- 14 weeks 0 days to less than 28 weeks 0 days of gestation by the time of the service was provided. Week of gestation by the time the service was provided is calculated based on date of baby birth, gestational weeks at birth and date of service provided (start date of AD in NHS dataset), that is: Week of gestation by the time the service = [Gestational weeks at birth] - [(Date of baby birth – date of service provided)/7 days].
References	

Status	**DONE**
Indicator Nr	**MP3_IIItrim**
Indicator	**% of pregnant women receiving an ultrasound in third trimester, conditional on seeking care through contracted services**
Tracer	High-risk pregnancy
Numerator or Calculation	Among pregnant women in the denominator: Number of pregnant women receiving an ultrasound between week 25 and week 42 of pregnancy.
Denominator or set of people for whom to calculate	Pregnant women aged 15–49 who had a live birth occurring in year t and received at least one NHS service within 42 weeks before delivery.
Source of data 1	CDPC Newborn registry
Source of data 2	NHS outpatient and manipulation data
Diagnosis and manipulation codes	Ultrasound examination in obstetrics, including the amortization of the ultrasound machine (manipulation code: 50695). Hide together with manipulation 50694, 50740,50741, 50742 Musculoskeletal ultrasonography (manipulation code: 50697)
Outstanding issues	

Notes	Compute for 2010-2014. Trimesters are counted from the first day of the last menstrual period. Thrid trimester- 28 weeks 0 days until delivery Week of gestation by the time the service was provided is calculated based on date of baby birth, gestational weeks at birth and date of service provided (start date of AD in NHS dataset), that is: Week of gestation by the time the service = [Gestational weeks at birth] - [(Date of baby birth – date of service provided)/7 days].
References	

Status	**DONE**
Indicator Nr	**MP4**
Indicator	**% of pregnant women tested for gonorrhea, chlamydia and HIV during pregnancy, conditional on seeking care through contracted services**
Tracer	High-risk pregnancy
Numerator or Calculation	Among pregnant women in the denominator: Number of pregnant women screening for gonorrhea, chlamydia and HIV during pregnancy
Denominator or set of people for whom to calculate	Pregnant women aged 15–49 who had a live birth occurring in year t and received at least one NHS service within 42 weeks before delivery.
Source of data 1	CDPC Newborn registry
Source of data 2	NHS outpatient and manipulation data
Diagnosis and manipulation codes	40191
Outstanding issues	
Notes	Compute for 2010-2014.
References	

Status	DONE
Indicator Nr	**MP7**
Indicator	**% of pregnant women receiving ultrasound during 10-13 week of gestation, conditional on seeking care through contracted services**
Tracer	High-risk pregnancy
Numerator or Calculation	Among pregnant women in the denominator: Number of pregnant women receiving an ultrasound between week 10 and week 13 of pregnancy.
Denominator or set of people for whom to calculate	Pregnant women aged 15–49 who had a live birth occurring in year t and received at least one NHS service within 42 weeks before delivery.
Source of data 1	CDPC Newborn registry
Source of data 2	NHS outpatient and manipulation data
Diagnosis and manipulation codes	Ultrasound examination with folds withers measurements before pregnancy week 12 including the amortization of the ultrasound machine (manipulation code: 50694). Hide together with manipulation 50695, 50740, 50741, 50742. Ultrasound examination in obstetrics, including the amortization of the ultrasound machine (manipulation code: 50695). Hide together with manipulation 50694, 50740,50741, 50742 Musculoskeletal ultrasonography (manipulation code: 50697)
Outstanding issues	It seems manipulation codes used for 2014 were not using the previous years.Musculoskeletal ultrasonography (manipulation code: 50697) is more frequently using for 2010-2013 and the others more used during 2014.
Notes	Compute for 2010-2014. Week of gestation by the time the service was provided is calculated based on date of baby birth, gestational weeks at birth and date of service provided (start date of AD in NHS dataset).
References	

Status	DONE
Indicator Nr	**MP8**
Indicator	**% of pregnant women receiving ultrasound for fetal anomalies during 18-20 weeks of gestation, conditional on seeking care through contracted services**
Tracer	High-risk pregnancy
Numerator or Calculation	Among pregnant women in the denominator: Number of pregnant women receiving an ultrasound between week 18 and week 20 of pregnancy.
Denominator or set of people for whom to calculate	Pregnant women aged 15–49 who had a live birth occurring in year t and received at least one NHS service within 42 weeks before delivery.
Source of data 1	CDPC Newborn registry
Source of data 2	NHS outpatient and manipulation data

Diagnosis and manipulation codes	Ultrasound examination in obstetrics, including the amortization of the ultrasound machine (manipulation code: 50695). Hide together with manipulation 50694, 50740,50741, 50742 Musculoskeletal ultrasonography (manipulation code: 50697)
Outstanding issues	It seems manipulation codes used for 2014 were not using the previous years.Musculoskeletal ultrasonography (manipulation code: 50697) is more frequently using for 2010-2013 and the others more used during 2014
Notes	Compute for 2010-2014. Week of gestation by the time the service = [Gestational weeks at birth] - [(Date of baby birth – date of service provided)/7 days].
References	

Status	**DONE**
Indicator Nr	**MP9**
Indicator	**% of pregnant women tested for HIV during pregnancy (anytime) conditional on seeking care through contracted services**
Tracer	High-risk pregnancy
Numerator or Calculation	Among pregnant women in the denominator: Number of pregnant women receiving HIV screen during pregnancy.
Denominator or set of people for whom to calculate	Pregnant women aged 15–49 who had a live birth occurring in year t and received at least one NHS service within 42 weeks before delivery.
Source of data 1	CDPC Newborn registry
Source of data 2	NHS outpatient and manipulation data
Diagnosis and manipulation codes	Tests for HIV (laboratory) manipulation codes: 41401, 41402, 41404, 41405
Outstanding issues	
Notes	Compute for 2010-2014.
References	

Status	DONE
Indicator Nr	**MP9_early**
Indicator	**% of pregnant women tested for HIV up to week 20, conditional on seeking care through contracted services**
Tracer	High-risk pregnancy
Numerator or Calculation	Among pregnant women in the denominator: Number of pregnant women receiving HIV screen before completion of 20 weeks of gestation
Denominator or set of people for whom to calculate	Pregnant women aged 15–49 who had a live birth occurring in year t and received at least one NHS service within 42 weeks before delivery.
Source of data 1	CDPC Newborn registry
Source of data 2	NHS outpatient and manipulation data
Diagnosis and manipulation codes	Tests for HIV (laboratory) manipulation codes: 41401, 41402, 41404, 41405
Outstanding issues	
Notes	Compute for 2010-2014. Early pregnancy: up to 20 weeks gestation by the time of the service was provided. Week of gestation by the time the service was provided is calculated based on date of baby birth, gestational weeks at birth and date of service provided (start date of AD), that is: Week of gestation by the time the service = [Gestational weeks at birth] - [(Date of baby birth – date of service provided)/7 days].
References	

Status	DONE
Indicator Nr	**MP10**
Indicator	**% of pregnant women screened for fetal Down syndrome, conditional on seeking care through contracted services during pregnancy**
Tracer	High-risk pregnancy
Numerator or Calculation	Among pregnant women in the denominator: Number of pregnant women receiving Down's Syndrome screen during pregnancy
Denominator or set of people for whom to calculate	Pregnant women aged 15–49 who had a live birth occurring in year t and received at least one NHS service within 42 weeks before delivery.
Source of data 1	CDPC Newborn registry
Source of data 2	NHS outpatient and manipulation data
Diagnosis and manipulation codes	49010; 49015; 49016; 41164; 41156; 49008; 49009.
Outstanding issues	
Notes	Compute for 2010-2014.
References	

Status	DONE
Indicator Nr	**MP11**
Indicator	**Cases of eclampsia and pre-eclampsia, per 10,000 pregnant women seeking care through contracted services during pregnancy**
Tracer	High-risk pregnancy
Numerator or Calculation	Among pregnant women in the denominator: Number of cases of maternal eclampsia and pre-eclampsia
Denominator or set of people for whom to calculate	Pregnant women aged 15–49 who had a live birth occurring in year t and received at least one NHS service within 42 weeks before delivery.
Source of data 1	CDPC Newborn registry
Source of data 2	NHS outpatient and manipulation data
Diagnosis and manipulation codes	ICD-10 codes for pre-eclampsia : O14 plus subcodes. ICD-10 for eclampsia are O15 and subcodes. SEMS: code 285B
Outstanding issues	
Notes	Compute for 2010-2014.
References	Benchmark countries: 5/10,000 maternities (Scandinavia), 6.2/10,000 deliveries (Netherlands),

Status	DONE
Indicator Nr	**MP12**
Indicator	**% of pregnant women receiving hepatitis B serologic screening during pregnancy, conditional on seeking care through contracted services**
Tracer	High-risk pregnancy
Numerator or Calculation	Among pregnant women in the denominator: Number of pregnant women receiving hepatitis B serologic screening during pregnancy
Denominator or set of people for whom to calculate	Pregnant women aged 15–49 who had a live birth occurring in year t and received at least one NHS service within 42 weeks before delivery.
Source of data 1	CDPC Newborn registry
Source of data 2	NHS outpatient and manipulation data
Diagnosis and manipulation codes	Manipulation code: 41301. Hepatitis B Serologic Screening.
Outstanding issues	
Notes	Compute for 2010-2014.
References	Manipulation codes suggested by Evija

Status	**DONE**
Indicator Nr	**MP14**
Indicator	**% of pregnant women tested for syphilis up to week 20, conditional on seeking care through contracted services**
Tracer	High-risk pregnancy
Numerator or Calculation	Among pregnant women in the denominator: Number of pregnant women receiving syphilis test before completion of 20 weeks of gestation
Denominator or set of people for whom to calculate	Pregnant women aged 15–49 who had a live birth occurring in year t and received at least one NHS service within 42 weeks before delivery.
Source of data 1	CDPC Newborn registry
Source of data 2	NHS outpatient and manipulation data
Diagnosis and manipulation codes	Tests for syphilis (laboratory) Manipulation codes: 41230, 41232, 41233, 41236, 41237, 41251, 41253
Outstanding issues	
Notes	Compute for 2010-2014. Early pregnancy: up to 20 weeks gestation by the time of the service was provided. Week of gestation by the time the service was provided is calculated based on date of baby birth, gestational weeks at birth and date of service provided (start date of AD), that is: Week of gestation by the time the service = [Gestational weeks at birth] - [(Date of baby birth – date of service provided)/7 days].
References	

Status	**DONE**
Indicator Nr	**MP15**
Indicator	**% of pregnant women screened for gestational diabetes, conditional on seeking care through contracted services**
Tracer	High-risk pregnancy
Numerator or Calculation	Among pregnant women in the denominator: Number of pregnant women screening for gestational diabetes during pregnancy
Denominator or set of people for whom to calculate	Pregnant women aged 15–49 who had a live birth occurring in year t and received at least one NHS service within 42 weeks before delivery.
Source of data 1	CDPC Newborn registry
Source of data 2	NHS outpatient and manipulation data
Diagnosis and manipulation codes	Glucose Load Test (laboratory) 41096. aka oral glucose challenge test, for pregnant women to diagnose gestational diabetes
Outstanding issues	Check whether manipulation code changed across years
Notes	Compute for 2010-2014.
References	

Status	DONE
Indicator Nr	**MP16**
Indicator	**% of pregnant women receiving blood group and Rhesus D status test in early pregnancy, conditional on seeking care through contracted services**
Tracer	High-risk pregnancy
Numerator or Calculation	Among pregnant women in the denominator: Number of pregnant women receiving blood group and Rhesus D status test before completion of 20 weeks of gestation
Denominator or set of people for whom to calculate	Pregnant women aged 15–49 who had a live birth occurring in year t and received at least one NHS service within 42 weeks before delivery.
Source of data 1	CDPC Newborn registry
Source of data 2	NHS outpatient and manipulation data
Diagnosis and manipulation codes	Blood group and Rhesus D status test. Manipulation codes: 40302; 40303; 40304 .
Outstanding issues	
Notes	Compute for 2010-2014. Early pregnancy: up to 20 weeks gestation by the time of the service was provided. Week of gestation by the time the service was provided is calculated based on date of baby birth, gestational weeks at birth and date of service provided (start date of AD), that is: Week of gestation by the time the service = [Gestational weeks at birth] - [(Date of baby birth – date of service provided)/7 days].
References	Manipulation codes suggested by Evija

Status	DONE
Indicator Nr	**MP17**
Indicator	**% of pregnant women tested for anemia up to week 20 and at 28 weeks, conditional on seeking care through contracted services**
Tracer	High-risk pregnancy
Numerator or Calculation	Among pregnant women in the denominator: Number of pregnant women tested for anemia before completion of 20 weeks of gestation and at 28 weeks of gestation
Denominator or set of people for whom to calculate	Pregnant women aged 15–49 who had a live birth occurring in year t and received at least one NHS service within 42 weeks before delivery.
Source of data 1	CDPC Newborn registry
Source of data 2	NHS outpatient and manipulation data
Diagnosis and manipulation codes	Manipulation codes: 40010; 40040; 40041; 41124
Outstanding issues	
Notes	Compute for 2010-2014. Early pregnancy: up to 20 weeks gestation by the time of the service was provided.

	Week of gestation by the time the service was provided is calculated based on date of baby birth, gestational weeks at birth and date of service provided (start date of AD), that is: Week of gestation by the time the service = [Gestational weeks at birth] - [(Date of baby birth – date of service provided)/7 days].
References	Manipulation codes suggested by Evija

Status	**DONE**
Indicator Nr	**MP18**
Indicator	**% of pregnant women tested for chlamydia up to week 20, conditional on seeking care through contracted services**
Tracer	High-risk pregnancy
Numerator or Calculation	Among pregnant women in the denominator: Number of pregnant women tested for chlamydia before completion of 20 weeks of gestation
Denominator or set of people for whom to calculate	Pregnant women aged 15–49 who had a live birth occurring in year t and received at least one NHS service within 42 weeks before delivery.
Source of data 1	CDPC Newborn registry
Source of data 2	NHS outpatient and manipulation data
Diagnosis and manipulation codes	Tests for chlamydia (laboratory) 41240, 41245, 41254, 41255, 41262, 41287, 41290 and 41291
Outstanding issues	
Notes	Compute for 2010-2014. Week of gestation by the time the service was provided is calculated based on date of baby birth, gestational weeks at birth and date of service provided (start date of AD), that is: Week of gestation by the time the service = [Gestational weeks at birth] - [(Date of baby birth – date of service provided)/7 days].
References	

Appendix 3: Specialist codes

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 4: Manipulation codes

	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
	Colonscopy	08112 (?)
OTHER DIAGNOSTICS		

	Procedure/test	Manipulation code
	Electrocardiogram with 12 leads (EKG)	06003 06004 06005 06013 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

	Procedure/test	**Manipulation code**
	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

Appendix 5: Dataset construction

Note: Dataset construction (*D-constructed-databases* folder): do files are listed in order of execution

Stata do file	Constructed dataset	Description of the constructed dataset	Steps for dataset construction
3-construct-databases\ 3-00-Inpatient-episodes-withdiseasecoding	**NHA\ 1-Inpatients_services\ Inpatient-episodes-withdiseasecoding**	Cleaned up dataset that contains the episode information for all inpatient episodes from 2009 till 2014.	Load PB_SPANS_tab2_clean.dta. Generate dummies to identify list of *diagnoses* in the admission and discharge codes. Clean up ficticious checkout information. Cleanup/flag overlapping episodes and date inconsistencies. Cleanup/recode incomplete/inconsistent episode discharge information, including information on truncated observations, transport to other hospitals and ficticious checkouts.
3-construct-databases\ 3-01-population-list	**people_lists\ D-01-population-list**	List of all persons that were alive at anytime between 2009 and 2014, with variable that identifies the year of birth, date of death (if applicable) and whether the person was found in the NHS registry, NHS inpatient and outpatient data, census and death registry.	Merge the list of people contained in the NHS registry, death registry, population census, NHS inpatient data and MHS outpatient databases. Inpatient data is from NHA\ 1-Inpatients_services\Inpatient-episodes-withdiseasecoding: this is important because this dataset contains new information on inpatient episodes (n=493) that ended in death and were not registered in the death registry.

Stata do file	Constructed dataset	Description of the constructed dataset	Steps for dataset construction
			Add gender, birth year and death date information from (in this order) the NHS registry, the death registry, the NHS inpatient data, the NHS outpatient data, and the census. Flag discrepancies between the datasets in terms of gender, birth year, and death date.
3-construct-databases\ 3-02-dead-list	**people_lists\ D-02-dead-list**	Subset of D-01-population-list: List of all persons that are coded as dead in D-01-population-list	Take the subset of population from D-01-population-list for which there is either a date of death, or there was an inpatient episode where the person was discharged dead
3-construct-databases\ 3-03-women-list	**people_lists\ D-03-women-list**	Subset of D-01-population-list: List of all persons that are coded as gender=female in D-01-population-list	Take the subset of population from D-01-population-list for whom the gender is female. Observations with missing gender information are excluded.
3-construct-databases\ 3-04-specialists-list	**people_lists\ D-04-specialists-*specialty***	List of providers that have at least one certificate in the corresponding *specialty*. Dataset is at the level of the provider. For each provider, it lists the specialty code, certification start date and expiration date of any certificate that corresponds to the *specialty*.	Compile a database of all certificates with the corresponding hc_person_id and the certificate code, start date and expiration date
			Code all certificates into the categories (cardio, neuro, cancer, mental, cvd)
			For each specialty: compile a list of hc_person_ids that have at least one relevant certificate for this specialty- database includes all certificates (for this specialty only) and their starting and expiration dates.

Stata do file	Constructed dataset	Description of the constructed dataset	Steps for dataset construction
3-construct-databases\ 3-05-poplist-bydisease	**people_lists\ D-05-population-w-*diagnosis***	Population list for diagnosis: Persons diagnosed with *diagnosis* in any of the inpatient, outpatient, disease registry (if exists for the condition), or death registry	Extract person pid's of anyone with a diagnosis x at anytime in inpatient, outpatient, registry, death registry or SEMS data.
			Merge those lists of pid's into one list per disease.
3-construct-databases\ 3-11-inpatient data	**NHS\ 1_Inpatient_services\ D-PB_SPANS_tab1-pop-w-*diagnosis***	Inpatient episode data for patients on the population list for *diagnosis*	Create a new inpatient record ID (ipr_id) that combines institution ID and episode ID. Merge dataset 3-05-population-w-*diagnosis* with the inpatient episode data (D-PB_SPANS_tab1-clean), using pid, keep the records that correspond to patients on the population list for *diagnosis.*
	NHS\1_Inpatient_services\D-PB_SPANS_tab2-pop-w-*diagnosis*	Inpatient movement data for patients on the population list for *diagnosis*	Create a new inpatient record ID (ipr_id) that combines institution ID and episode ID. Merge dataset 3-05-population-w-*diagnosis* with the inpatient movement data (D-PB_SPANS_tab2-clean), using pid, keep the records that correspond to patients on the population list for *diagnosis.*
	NHS\ 1_Inpatient_services\ D-PB_SPANS_tab4-pop-w-*diagnosis*	Inpatient manipulation data for patients on the population list for *diagnosis*	Create a new inpatient record ID (ipr_id) that combines institution ID and episode ID. Merge dataset 3-05-population-w-*diagnosis* with the inpatient movement data (D-PB_SPANS_tab4-clean), using pid, keep the records that correspond to patients on the population list for *diagnosis.*

Stata do file	Constructed dataset	Description of the constructed dataset	Steps for dataset construction
3-construct-databases\3-12-outpatient-data	**NHS\ 2_Outpatient_services\ D-Outpatient_2009-2014-pop-w-*diagnosis***	Outpatient episode data for patients on the population list for *diagnosis*	Create a new outpatient record ID (opr_id) that combines institution ID and episode ID. Extract outpatient episode data for patients on the population list for diagnosis x.
3-construct-databases\ 3-13-medicines	**NHS\ 3-Reimbursable_medicines\ D-BMN_PB_2009-2014-pop-w-*diagnosis***	Medicine data for patients on the population list for *diagnosis*	Extract medicine data for patients on the population list for *diagnosis*.
3-construct-databases\ 3-14-sems-data	**SEMS\ D-sems_2011-2014-pop-w-*diagnosis***	SEMS transfer data for population list for *diagnosis*	Append the SEMS data for 2011, 2012, 2013, 2014. Extract SEMS transfer data for patients on the population list for *diagnosis.*
3-construct-databases\ 3-15-death registry	**CDPC\ death_registry-pop-w-*diagnosis***	Death registry data for people on the population list for *diagnosis.*	Extract death registry data for people on the population list for *diagnosis*.
3-construct-databases\ 3-16-population-list-ses	**people_lists\D-01-population-list-ses**		
3-construct-databases\ 3-17-diagnosis-lists	**diagnosis_lists\D-diagnosis-*diagnosis-year***	Datasets that contain the pid, diagnosis date, source of data for the diagnosis and diagnosis year for all diagnoses of *diagnosis.*	Extract the pid and dates of diagnoses of *diagnosis* from NHS inpatient information (NHS\1_Inpatient_services\D-PB_SPANS_tab2-pop-w-diagnosis), NHS outpatient information (NHS\2_Outpatient_services\D-Outpatient_2009-2014-pop-w-diagnosis), SEMS information (SEMS\D-sems_2011-2014-pop-w-diagnosis), death registry

Stata do file	Constructed dataset	Description of the constructed dataset	Steps for dataset construction
			(CDPC\death_registry-pop-w-diagnosis). Create yearly files.
3-construct-databases\3-18-inpatient-episodes-dates-bydisease	**NHS\ 1-Inpatients_services\ Inpatient-dates**	Cleaned up dataset that contains the dates of all inpatient episodes for all patients that were inpatient at least once between 2009 and 2014.	Load NHA\1-Inpatients_services\Inpatient-episodes-withdiseasecoding. Reshape into a dataset at the level of the person. For each person, list the start, end dates of each inpatient episode as well as the admission codes and corrected discharge codes.
	NHS\ 1-Inpatients_services\ Inpatient-dates-pop-w-*diagnosis*	Dataset is a subset of NHS\1-Inpatients_services\Inpatient-dates-pop-w-diagnosis and contains the dates of all inpatient episodes for those patients on the population list for diagnosis	Merge NHS\1-Inpatients_services\Inpatient-dates with people_lists\D-05-population-w-diagnosis. Keep the records for those pid that appear in both datasets.