Medicines Optimisation
Using data to assess the quality of care in heart failure

Summary
Data can be extracted from a number of accessible databases to build a picture of care across a Clinical Commissioning Group (CCG) or at practice level. Cardiovascular disease (CVD) profiles can be used to assess current disease burden – for heart failure (HF) specifically, these show the rate of hospital admission for HF compared to the national average. The National Heart Failure Audit Project reports allow comparison of HF care between local acute trusts, while Quality and Outcomes Framework (QOF) data highlight potential unmet need in the use of core evidence based therapies for heart failure in primary care. This data can be used to support the development of a business case to facilitate better medicines optimisation in this area, for example through improved specialist community heart failure services, investment in education and training for GPs and practice staff or prescribing incentive schemes to maximise uptake of Angiotensin-converting enzyme inhibitors (ACEI) / Beta-adrenoceptor blockers (beta-blockers).

Who might use this paper?
- Commissioners wanting to benchmark their local HF services and / or identify areas for service improvement
- Providers wanting to build a business case to support a service development for patients with HF
- Medicines optimisation teams wanting to develop new medicine optimisation schemes in primary or secondary care for patients with HF
- Practice and CCG pharmacists working to optimise medicines for patients with HF
- Commissioners and providers planning the implementation of new NICE guidance for sacubitril / valsartan (Entresto®)

The NHS has a wealth of data available, but many frontline staff are unsure where to find it or how to use it to support medicines optimisation. An understanding of the data sets available, how to access and extract the data required and how to interpret the data to build a robust picture of current practice in relation to the clinical evidence base is essential to justify investment in medicines optimisation projects to drive improved outcomes. This paper will focus on medicines optimisation in heart failure (HF) to demonstrate what data is available, where it can be found on current databases and how it might be used.

*Throughout the paper, Lewisham CCG has been used as a worked example of how to access and utilise the data.*
Background

HF represents the only major cardiovascular disease with increasing prevalence and is responsible for dramatic impairment of quality of life, carries a poor prognosis for patients and is very costly for the NHS to treat (second only to stroke). In most CCGs, HF is the second most frequent reason for hospital admission. Once admitted to hospital, patients with HF tend to have an extended length of stay and therefore represent a significant financial burden to the NHS. (See Appendix – Value of MO in heart failure)

Key to reducing hospitalisation and maintaining patients in primary care is:
- appropriate management of diuretics to reduce the risk of decompensation
- initiation and optimisation of ACEI or Angiotensin-II receptor antagonists (ARB) and beta-blocker therapies in patients with left ventricular systolic dysfunction (LVSD)
- early identification of patients requiring additional intervention.

A marker of quality in HF is the proportion of patients with LVSD taking ACEi/ARB and beta-blocker therapies. In addition, the NICE Quality standard states that ‘people with chronic heart failure due to left ventricular systolic dysfunction are offered angiotensin-converting enzyme inhibitors (or angiotensin II receptor antagonists licensed for heart failure if there are intolerable side effects with angiotensin-converting enzyme inhibitors) and beta-blockers licensed for heart failure, which are gradually increased up to the optimal tolerated or target dose with monitoring after each increase’.1

Sources of Information:
- Cardiovascular Disease Profiles
- National HF Audit (acute care)
- Quality and Outcomes framework including information from the Health and Social Care Information Centre (HSCIC)

CV Disease Profiles

CV Disease Profiles, developed by the National Cardiovascular Intelligence Network (NCVIN) can be accessed at http://www.yhpho.org.uk/ncvinside/. Selecting the NHS region will display the reports available at Clinical Commissioning group (CCG) level within the region (figure 1).
A number of different reports can be accessed at CCG level to highlight the current picture with regard to CV management (overview, risk factors, heart disease, diabetes, kidney disease and stroke). Heart Failure data can be accessed by clicking on the Heart Disease report for the relevant CCG – circled in figure 1.

Within the report the details of various elements of heart disease care are highlighted. For example, in 2013/14 the admission rate for heart failure for all persons in NHS Lewisham CCG was 214.8 per 100,000 (321 admissions) (See page 5 of report). This is significantly higher than England. The admission rate for heart failure in NHS Lewisham CCG has increased by 52% between 2003/04 and 2013/14. 

http://www.yhpho.org.uk/ncvincvd/pdfs/Heart/08L_Heart.pdf (see Figure 2)

The cost of a non-elective HF admission with co-morbid conditions is £4,309. Hence the costs of hospital admission for HF for Lewisham CCG is in the order of £1.4million per annum.
National HF Audit – Acute Care
This is a hospital audit of unscheduled admissions due to heart failure. Data from the National HF audit is published annually by NICOR at https://www.ucl.ac.uk/nicor/audits/heartfailure/reports

The 2013/14 report includes an overview of the patient cohort treated in UK hospitals for heart failure over the preceding year and highlights key elements of care, such as access to specialist care, uptake of evidence based therapies (Figure 3) and mortality rates in-hospital, over 30 days, at one year and five years.

Figure 3: Treatment on Discharge for LVSD by place of care (National HF Audit 2015; page 20)

<table>
<thead>
<tr>
<th>Medication</th>
<th>Cardiology ward (%)</th>
<th>General medical ward (%)</th>
<th>Other ward (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACE inhibitor</td>
<td>76</td>
<td>59</td>
<td>69</td>
</tr>
<tr>
<td>ARB</td>
<td>19</td>
<td>17</td>
<td>19</td>
</tr>
<tr>
<td>ACE and/or ARB</td>
<td>88</td>
<td>79</td>
<td>61</td>
</tr>
<tr>
<td>Beta blocker</td>
<td>88</td>
<td>78</td>
<td>80</td>
</tr>
<tr>
<td>MRA</td>
<td>57</td>
<td>47</td>
<td>43</td>
</tr>
<tr>
<td>ACEI and/or ARB, beta blocker and MRA</td>
<td>48</td>
<td>38</td>
<td>32</td>
</tr>
<tr>
<td>Loop diuretic</td>
<td>90</td>
<td>95</td>
<td>93</td>
</tr>
<tr>
<td>Thiazide diuretic</td>
<td>6</td>
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<td>4</td>
</tr>
<tr>
<td>Digoxin</td>
<td>22</td>
<td>21</td>
<td>22</td>
</tr>
</tbody>
</table>

Local acute trust data is included in the report – including number of admissions and involvement of cardiology / specialists (Figure 4); and use of ACEI/ARB, beta-blocker and mineralocorticoid receptor antagonist (MRA) and follow up on discharge (Figure 5)

Figure 4: In-hospital case of Heart Failure (National HF Audit 2015; pages 43-50)

For Lewisham, this highlights significant variation between the services offered by the two local acute trusts, in particular the rates of cardiology or specialist input which may impact on patient outcomes.
Figure 5 shows variation in the use of core drug therapies shown to improve patient outcome as well as discharge planning processes, referral to HF nurse specialist or cardiology follow up post discharge, and referral to cardiac rehabilitation – all of which could impact on patient outcome. Figures 4 and 5 are useful in benchmarking local services.

Quality and Outcomes Framework – Primary Care
Annual QOF data can be readily accessed online at [http://www.gpcontract.co.uk/browse/08L/Heart%20Failure/15](http://www.gpcontract.co.uk/browse/08L/Heart%20Failure/15)
Data can be reviewed at country level (England, Scotland, Wales), by commissioning region, by CCG or at practice level. To review data at a CCG level, search by CCG using the search box at the top right hand corner of the screen and select the correct organisation from the list generated. Each clinical indicator on QOF can then be reviewed for the CCG selected (Figure 6)
Quality and Outcomes Framework (QOF) Data: Heart Failure

The four clinical indicators for heart failure are:

- HF001. The contractor establishes and maintains a register of patients with heart failure
- HF002. The percentage of patients with a diagnosis of heart failure (diagnosed on or after 1 April 2006) which has been confirmed by an echocardiogram or by specialist assessment 3 months before or 12 months after entering on to the register
- HF003. In those patients with a current diagnosis of heart failure due to left ventricular systolic dysfunction, the percentage of patients who are currently treated with an ACE-I or ARB
- HF004. In those patients with a current diagnosis of heart failure due to left ventricular systolic dysfunction who are currently treated with an ACEI or ARB, the percentage of patients who are additionally currently treated with a beta-blocker licensed for heart failure

CCG outcomes for this indicator can be seen in figure 7, with Lewisham CCG having a HF register of 1,532 people with a prevalence of 0.5%.

At face value, achievement of the QOF indicators for HF seem impressive (figure 8; highlighted green), with indicators HF002 to HF004 all achieving >95%. Of the 1,532 on the register 989/1038 (95.3%) have had a diagnosis of heart failure (diagnosed on or after 1 April 2006) which has been confirmed by an echocardiogram or by specialist assessment 3 months before or 12 months after entering on to the register (HF002).
In terms of drug therapy;
- HF003: 310/314 are on and ACEI / ARB (98.7%)
- HF004: 279/288 are on ACEI/ARB and a beta-blocker (96.9%).

Similar data is presented in the Right Care NHS focus packs (April 2016) which can be found at https://www.england.nhs.uk/resources/resources-for-ccgs/comm-for-value/london-region/#21. For Lewisham CCG, for heart failure due to LCVD, both ACEI / ARB and Beta-blocker use are >90% (Figure 9). As a result the pack concludes there is little opportunity to improve this element of HF care for this specific CCG.

Figure 9: Right Care Focus Pack (April 2016)

Looks good, but if we think of the QOF figures in the context of the entire HF register, in absolute numbers of patients – the data suggests that only 310 patients on the HF register are on an ACEI/ARB and only 279 are on an ACEI/ARB and a beta-blocker (Figure 8; highlighted red). Patients who only have the generic heart failure code (G58) (ie it is not clear whether or not they have left ventricular dysfunction) are not included in QOF data on use of ACEI/ARB and beta blockers, so we cannot determine overall use in heart failure from QOF.

Does this matter?
This CCG has a HF register size of 1,532, but only 310 individuals (20%) appear to be on an ACEI/ARB and only 279 (18%) appear to be on ACEI/ARB and beta-blocker – core therapies in HF due to LVSD which are known to reduce mortality and hospitalisations. This is in the setting of a CCG in which HF hospital admissions have increased by 52% over 10 years.

There can be a number of underlying reasons for this apparent low level of prescribing of evidence based therapies:
1. Poor coding on the GP IT systems
ACEI/ARB and beta-blocker are only indicated in HF due to LVSD, which represents only a proportion of patients with HF – however, it is expected to comprise approximately 50% of HF patients. If patients are not specifically coded as ‘LVSD’ the GP IT system cannot identify them as requiring ACEI / ARB and beta-blocker and therefore will not include them in the denominator for this indicator. Hence CCGs / practices with very low prescribing rates can achieve apparently high % rates of ACE/ARB and BETA-BLOCKER use.

**Generic HF code:** G58
**Specific LVSD code:** 585f (Echo shows left ventricular dysfunction)
**Specific Heart Failure with preserved ejection fraction (HFPEF) code – G583**

By definition all patients with HF have either LVSD (585f) or HFPEF (G583). Application of these codes would ensure inclusion of all patients with LVSD in the indicators for ACEI/ARB and beta-blocker, and represent a more realistic view of the uptake of evidence based therapies.

2. Exception reporting
Patients can be exception reported from the QOF indicators at practice level. The QOF includes the concept of ‘exception reporting’ to ensure that practices are not penalised where, for example, patients do not attend for review, or where a medication cannot be prescribed due to a contraindication or side-effect. Variation in exception reporting between practices could reflect differences in practice population (ie large number of patients in nursing homes), or may indicate failure to implement evidence based therapies.

Exception reporting rates for all the QOF indicators are published on the HSCIC website – QOF data for the 2014/2015 can be found at: [http://www.hscic.gov.uk/catalogue/PUB18887](http://www.hscic.gov.uk/catalogue/PUB18887).
Data is available at region and national level, sub-region and area team level, CCG or practice level. (Figure 10)

**Figure 10: QOF data reports and spreadsheets at:**

Clicking on the tab ‘Prevalence, achievements and exceptions at CCG level [xls]’ opens a spreadsheet – different QOF indicator data sets can be accessed by clicking on the different worksheets (AF, BP, CHD, CVDPP, HF etc) – (Figure 11)
Figure 11: Prevalence achievements and exceptions at CCG level spreadsheet

Data can be sorted by region, sub-region, area team and CCG. Scrolling across the spreadsheet the historical and current QOF data can be accessed, including the exception reporting rates for each indicator.

For example for HF004: In those patients with a current diagnosis of heart failure due to left ventricular systolic dysfunction who are currently treated with an ACE-I or ARB, the percentage of patients who are additionally currently treated with a beta-blocker licensed for heart failure; the exception reporting rate varies from 6.58% to 32.32% between CCGs across England (Figure 12).

Figure 12: CCG level QOF data on Heart Failure 0003 and 0004 QOF Indicators highlighting % exception reporting rates

The data is also available to be downloaded at practice level in a zip file containing individual spreadsheets for each QOF indicator. The Cardiovascular data can be accessed here: http://www.hscic.gov.uk/catalogue/PUB18887/qof-1415-prac-cardiovasculargroup.zip

The practice level data for 2014/15 shows variation in exception reporting for use of ACEI/ARB and a beta-blocker from 0% to 100% across the individual GP practices in England! Variation between practice exception reporting levels within a CCG should be explored to ensure it can be justified.
3. Lack of a clear HF diagnosis
Since 2004, a HF diagnosis should be confirmed by ECHO or a heart failure specialist however, some historic diagnoses still exist on the system, and some patients on the register have never has a formal diagnosis of heart failure confirmed. In Southwark CCG, a review of heart failure registers suggested that up to 15% of patients on the heart failure register do not have a confirmed diagnosis. A large proportion of these patients do not have heart failure when the appropriate investigations are carried out and are therefore suitable for removal from the HF register. Cleaning the registers in this way has an impact on the detected prevalence of heart failure at practice and CCG level.

4. Failure to initiate evidence based therapies
Despite the robust evidence base, there remains some reluctance, outside of HF specialist settings, to initiate heart failure therapies that improve prognosis, including ACEI and beta-blockers in patients who are stable / asymptomatic. Patients not on an ACEI / ARB following a hospital admission for heart failure have a 56% increase in the risk of death within 30 days and almost double the mortality rate at one year (36% compared to 21%) (National HF Audit 2015). Primary care needs support to prioritise the initiation (and dose titration) of these agents in order to maximise the outcomes for patients.

Implications for the Introduction of New Drugs – Sacubitril valsartan
Sacubitril valsartan has been approved by NICE for patients as a second line option for treating symptomatic chronic heart failure with reduced ejection fraction, only in people:
- with NYHA class II to IV symptoms and
- with a left ventricular ejection fraction of 35% or less and
- who are already taking a stable dose of ACE inhibitors or ARBs.

NICE estimates that in England around 108,000 people with heart failure with reduced ejection fraction and NYHA class II to IV symptoms, with a left ventricular ejection fraction of 35% or less and taking an ACE inhibitor/ARB are likely to be eligible for sacubitril valsartan. Net costs for implementation of the drug, taking into account reduced hospital admissions, are predicted to increase from £12.6m in 2016/17 to £69m assuming 60% uptake by 2020/21 (plus VAT where applicable). Using the NICE resource impact template, the predicted costs for Lewisham (based on population 285,000; HF prevalence 0.5%) are £45k in 2016/17 increasing to £238k by 2020/12 (plus VAT where applicable).

https://www.nice.org.uk/guidance/ta388

Other second line options in the NICE HF Pathway include:
- an aldosterone antagonist licensed for heart failure (especially if the patient has moderate to severe heart failure [NYHA[18] class III–IV] or has had an MI within the past month) or
- an angiotensin II receptor antagonist (ARB) licensed for heart failure[19] (especially if the patient has mild to moderate heart failure [NYHA class II–III]) or
- hydralazine in combination with nitrate (especially if the patient is of African or Caribbean origin[20] and has moderate to severe heart failure [NYHA class III–IV])


Optimisation of first-line treatments, specifically ACEI / ARBs and beta-blockers, should therefore be a priority – with sub-optimal use of these core therapies potentially leading to a greater need for second line, and higher cost, options such as sacubitril valsartan. CCGs with poor % rates of ACEI and beta-blocker in patients with HF due to LVSD, should be seeking to ensure uptake of these therapies is maximised to ensure the use of second line treatments is based on clinical need; and usage / cost does not exceed that predicted by the NICE model as a result of failure to optimise first line treatments.
Overview of HF care from worked example Lewisham CCG: What we know now
- The CCG has a higher rate of hospital admission for heart failure than the England average and admission rates have increased by 52% over a 10 year period
- This high hospital admission rate is associated with significant cost to the local health economy
- There is variation in the delivery of core aspects of care in the local acute trusts, as shown by the National HF Audit project
- The rates of prescribing of core HF drugs (ACEI / ARB and beta-blockers in primary care) appear low, with only 20% of HF patients on ACEI / ARB and 15% on ACEI/ARB and Beta-blocker according to the QOF data. Reasons for these apparently low prescribing rates and variation between practices need to be explored.
- Low rates of ACEI / beta-blocker use may lead to increased need for second-line options such as sacubitril valsartan with resulting increased medicines costs.

This data indicates that there is an opportunity for medicines optimisation for patients with HF within Lewisham CCG, with the aim of improving outcomes for this patient group.

References
1. NICE CG108 2010 Chronic Heart Failure in Adults. https://www.nice.org.uk/guidance/cg108 (accessed 4.2.16)
2. HRG4 from Reference NHS IPhone / IPad App Version 4.2.2015

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Appendix

Value of medicines optimisation in heart failure

Key to reducing hospitalisation and maintaining patients in primary care is:
- appropriate management of diuretics to reduce the risk of decompensation,
- initiation and optimisation of ACEI and beta-blocker therapies if left ventricular systolic dysfunction
- early identification of patients requiring additional intervention.

In HF, ACEI therapy has been shown in real world practice to reduce mortality by 42% and beta-blocker therapy by 58%. Failure to optimise treatment will mean that this patient-orientated outcome is not achieved.

Dose titration of ACEI and beta-blockers has been shown to reduce hospitalisation and reduce healthcare costs. Cost-effectiveness analysis has shown that dose titration of ACEI costs £3600/life year gained, and is therefore highly cost effective.

Studies of high vs low dose ACEI have shown that dose titration is associated with a reduction in HF hospital costs in the order of £800 per patient. Another study demonstrated a 28% reduction in 90 day hospital admissions where ACEI therapy was optimised. With the introduction of newer, and more expensive therapies, failure to optimise ACEI therapy could lead to significantly increased drug costs.

An economic analysis of beta-blockers in chronic severe heart failure undertaken in Ireland indicated an incremental cost-effectiveness ratio for carvediolol of 1560 euro per life year gained. Another American study concluded that beta-blocker therapy increased survival by 0.3 years per patient and reduced societal costs by 3,959 US dollars per patient over 5 years. Medicare costs declined by 6,064 US dollars per patient, due primarily to lower hospitalization rates.


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