Income forecasting

Strategic delivery:	☐ Safe, ethical, effective treatment	☐ Consistent outcomes and support	☒ Improving standards through intelligence
Details:			
Meeting	Authority		
Agenda item	7		
Paper number	HFEA (24/01/2018) 864		
Meeting date	24 January 2018		
Author	Richard Sydee (Director of Finance and Resources) Caylin Joski-Jethi (Head of Intelligence)		
Output:			
For information or decision?	For decision		
Recommendation	The Authority is asked to approve our intention to: • incorporate this model in to our financial and business planning for 2018/19, testing the validity of this model on our emerging 2017 data • keep fees for 2018/19 unchanged • bring a further update of the model to the Audit and Risk Committee in mid-2018		
Resource implications	In budget		
Implementation date	2017/18 business year		
Communication(s)	Publication on HFEA website.		
Organisational risk	☒ Low	☐ Medium	☐ High
Annexes	Annex A: Income forecasting methodology Annex B: Forecast methods		

1. Introduction

1.1. Forecasting trends in the number and type of fertility treatments is not straightforward. The level of treatments in any given year depend on a complex interplay of the amount of public resources available (which varies across the four nations of the UK), the spending power of patients (the majority of which pay for the treatments themselves), and the demographic profile of the patient population.

1.2. Yet accurate forecasting is of more than academic interest. For many years the HFEA has derived the majority of its income from a funding model which levies a charge against each treatment carried out (currently £80 per IVF cycle transfer and £35 for DI treatments). HM Treasury rules require the HFEA to recover the full cost of regulation and no more, subject to contingencies to cover salaries and the like if funding fell below expected levels. In recent years the HFEA has struggled to accurately forecast the likely number of treatments in any given year, with the result that it has regularly built up a surplus above and beyond what is required by Treasury rules. In response, the HFEA has reduced its fees to attempt to bring the budget into balance and it has used past surpluses to fund its Information for Quality (IFQ) programme, which has modernized the way in which we collect, verify, and use the data we hold, to the benefit of clinics and patients alike.

1.3. The analysis contained within the paper illustrates the trends in treatment activity over the past 10 years, and highlights the variation between different age bands and regions in terms of activity growth. This analysis is of significant interest and use in its own right.

1.4. This paper represents the first step in developing a new, more reliable, income forecasting model (attached at annex A). The model aims to identify the high-level factors that influence treatment activity and income. We will use it, and further planned work, to inform future discussion with the sector around fees, ensuring that we continue to recover our full operating and costs and provide value for money.

2. The model

2.1. The forecasting model (Annex A) demonstrates that the treatment rate per capita is 0.44% (2016) and has increased steadily since 2007. This treatment rate per capita means that around 44 women in every 10,000 had a chargeable treatment in 2016.

2.2. The prevalence of infertility in the UK population is around 14%[1] (around 14 in every 100 women; or 1400 in every 10,000) which suggests that, despite significant increases in the uptake of fertility treatment over the past 25 years,

[1] https://www.nhs.uk/conditions/infertility/

the sector is still a very long way from market capacity (even allowing for the fact that IVF is not suitable for all who have problems with their fertility).

2.3. The forecasting model shows that treatment rates vary by age band, and that different regions have shown different long-term trends in fertility treatment activity. These have not been incorporated into the model for reasons set out in Annex A.

2.4. The model is based on forecasting the projected rate from past performance (using either a linear forecast or ETS model, methods which are explained at Annex B). This approach was selected as a common and replicable forecasting method, with the additional benefit that that the projected rate can then be applied to variants of the ONS population projections. This means that the rate can be applied to alternative population projections which might include substituted demographic assumptions (for example, the impact of Brexit on international migration).

3. Key forecasts from the model

3.1. Both methods (linear forecasting and ETS) forecast increases in the number of chargeable treatments, based on historic patterns to date. By 2020, both suggest the number of treatments will increase from 67492 in 2016 to between 70906 and 78319. In the first 6 months of 2017/18, there have been 34,564 chargeable treatments – the ETS quarterly method forecasted 34,884 treatments: this was an error of only -320 treatments (+0.93%).

3.2. Treatment income is projected to increase from £4,850,819 in 2016 to between £5,454,427 and £5,896,934 by 2020, with the lower estimate for growth still providing an annual increase in income of c2% per annum.

3.3. Taking the lower 95% interval, we would still see growth of c£90k each year through to 2020 (based on 2016/17 outturn). Although very early the increase we have seen in the first 6 months of this financial year is very similar to this estimate: using the quarterly estimates, income in the first 6 months of 2017/18 has been £2,668,730, compared to a quarterly forecast of £2,665,138 (an error of £3,592, or -0.13%). The income is within the confidence interval of £2,527,770 to £2,802,505.

3.4. We've achieved a very high accuracy rate for short term forecasting using the methods selected. This exploratory work will inform whether we invest further resources into developing more advanced models.

3.5. The combined impact of the factors discussed in this document indicate a likely increase in demand for fertility treatment and therefore chargeable activity over the next 5 years. The current model in the first 6 months of 2017/18 is accurate to within 99.8%.

4. Recommendations

4.1. That we incorporate this model in to our financial and business planning for 2018/19, testing the validity of this model on our emerging 2017 data to determine if the results from the analysis provide realistic estimates of activity and income.

4.2. In terms of fee changes we propose keeping fees for 2018/19 unchanged. The sector appreciates stability in terms of our fees and the information presently at hand does not indicate we could reduce our fees materially for 2018/19 based on forecast increased activity.

4.3. We propose to bring a further update of the model to the Audit and Risk Committee in mid-2018, which will allow us to combine our improved income forecast model with the three-year financial plan and proposals for future fees from April 2019.

Annex A: Income forecasting methodology

1. Background

1.1. The HFEA derives its income primarily from charging a fee for certain treatments: presently £80 for an IVF cycle/transfer and £35 for DI treatments.

1.2. This report aims to identify the high-level factors[2] influencing income generated from patient fees at the HFEA and to explore the practicality of developing a simple forecasting model for treatment activity and income.

1.3. The fertility sector is a rapidly developing sector, responding to technical advances, market activity, national campaigns and increased public awareness. Therefore, forecasting techniques, which are based only on what has happened historically, will be most valuable where the historic market most closely reflects how we anticipate the market will continue to develop. This means that short term forecasts are likely to be more accurate than long-term forecasts, which might be affected by market changes that we can't currently anticipate.

1.4. By analysing the historic activity trends, we can begin to understand the factors that need to be considered when developing a future forecasting methodology. We have chosen to review chargeable treatment cycles across the sector since 2007 as the data across this period is consistent for both NHS and privately funded treatments and as such provide a statistically valid sample for analysis.

1.5. The output from this report and the further work we will undertake will be used to inform future discussions around fees, ensuring we continue to recover our operating costs and provide value for money.

2. Patient age variation

2.1. It's important to understand how treatment activity varies by patient age so that changes in the overall population demographic profile can be mapped to future fertility treatment activity (and therefore income).

2.2. The age profile shows that for all treatment types, and over time, the bulk of cycles take place for women who are between 31 and 40. The age profile is slightly lower for DI cycles compared to IVF, and there has also been a greater shift towards a younger profile for DI cycles when compared to 2012.

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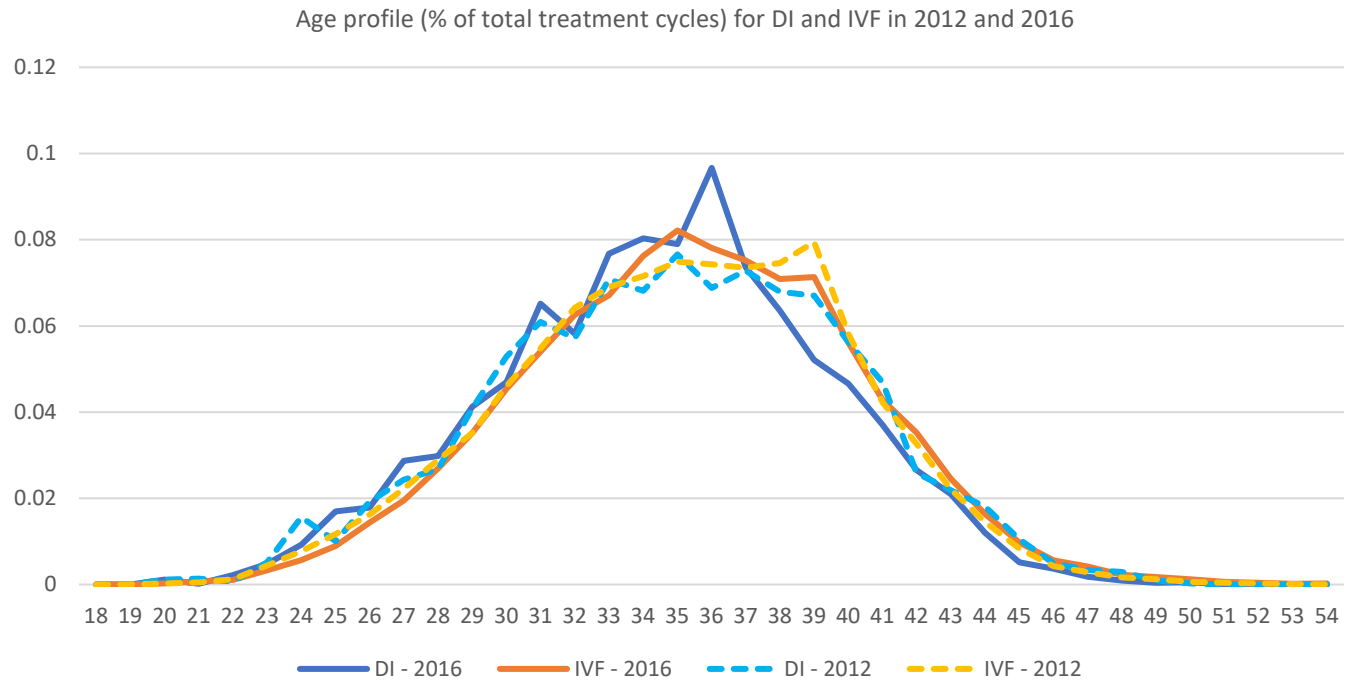
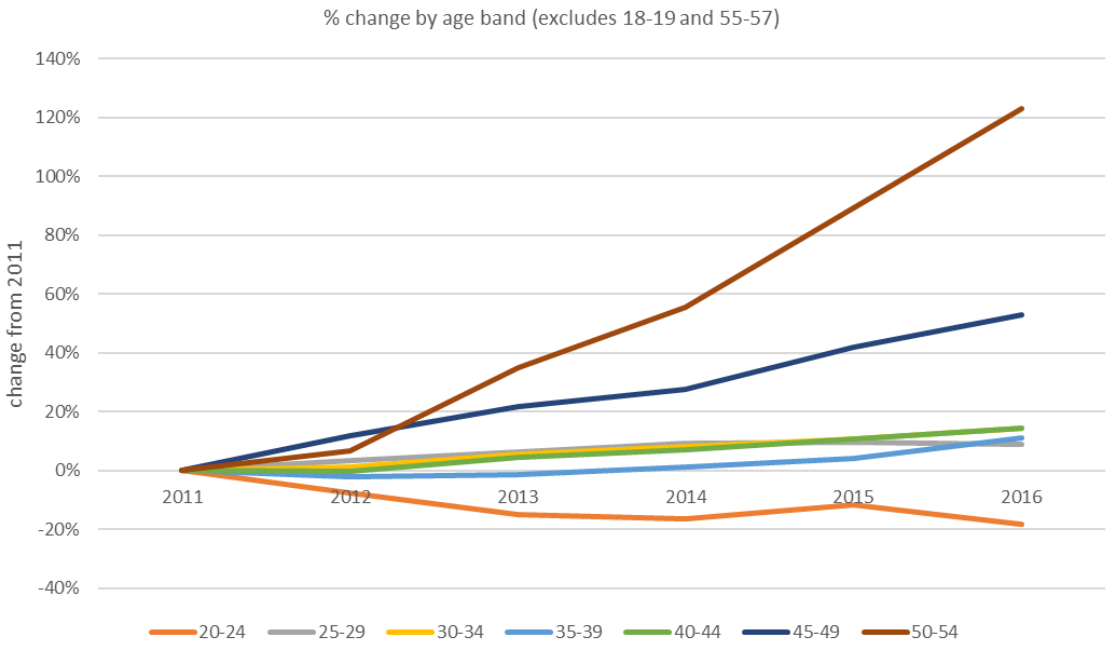
[2] The data used in the production of this report contains unverified data, and was extracted in October 2017. Data is subject to change over time as it is a live register. The term treatment, as used in this document, refers to a chargeable treatment cycle (typically one that involves a transfer of eggs, or DI, but may include other definitions).



2.3. The greatest rate of growth in number of cycles has been seen in the older age bands: 45 to 54, whilst the 20-24 age band has decreased. The high percentage increases seen in some of the smaller age bands (e.g. 45 to 54) have a relatively small real impact on the number of cycles over time, due to their small initial numbers; however, it does suggest that we should monitor and remain abreast of any changes within individual age bands as each shows difference patterns of change over time.

2.4. There has been consistent growth in treatment cycles for women aged 25 to 39 – also the age bands with the highest numbers of ferility treatments.



3. Regional variation

3.1. Understanding how treatment activity varies by region could allow us to develop more tailored forecasts.

3.2. There is significant variation in regional growth over the past 10 years, but we have not yet explored how this might impact on the overall forecast.

4. Treatment activity

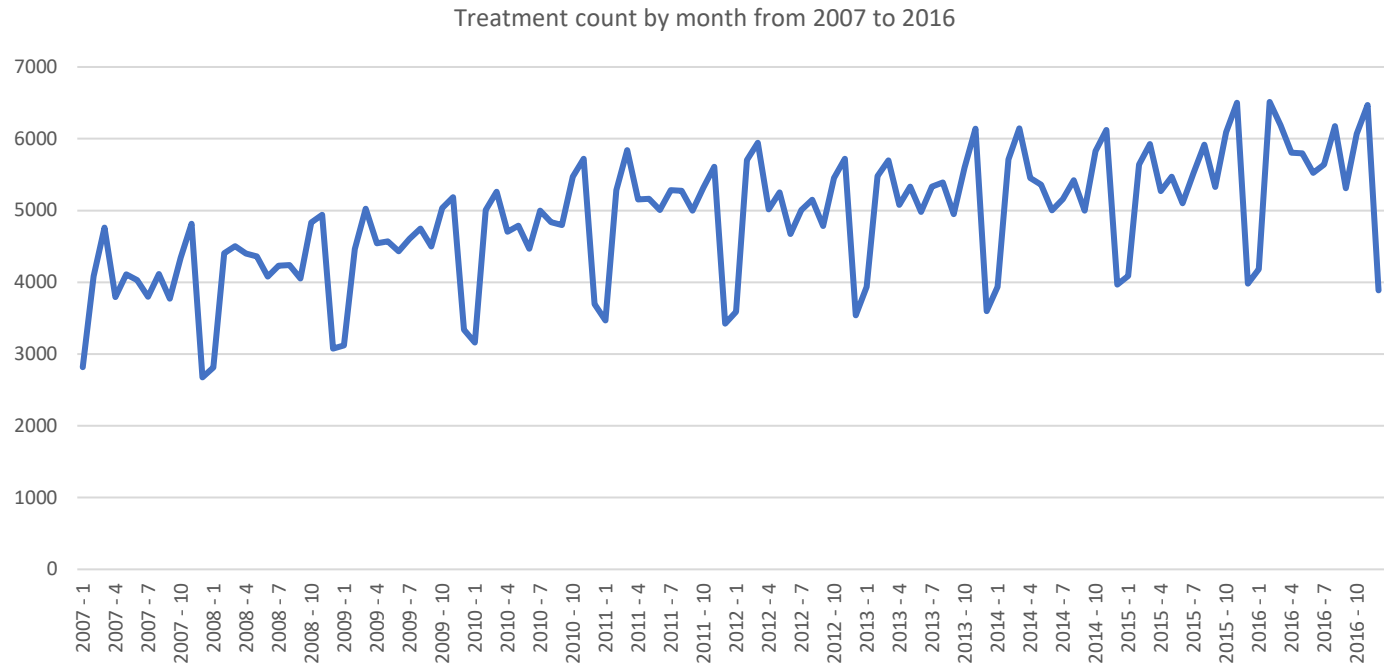
4.1. Knowing how treatment activity (and therefore income) fluctuates over time and throughout the year, enables us to plan efficient use of our resources within and across financial years.

4.2. The number of annual treatment cycles across the sector has increased by 39% for DI, and 44% for IVF from 2007 (an average of 4.3% and 4.9% each year respectively). The proportion of DI-IVF cycles has remained constant over time.

Year	DI	IVF	% IVF
2007	3,900	43,219	92%
2008	3,999	45,944	92%
2009	3,896	49,666	93%
2010	3,946	52,961	93%
2011	4,108	55,717	93%
2012	4,478	55,354	93%
2013	4,641	56,873	92%
2014	4,696	58,409	93%
2015	4,971	59,866	92%

2016	5,440	62,120	92%

4.3. There is a seasonal pattern in chargeable treatments for all patients. The same seasonal variation is observed across all regions, funding types and patient age. This is important to note as it means income is expected to fluctuate significantly each quarter, which may have implications on financial planning.



5. Funding of treatment

5.1. Although we don't include funding type in the final model, we explored changes in funding type over time, as national policy changes may have an impact on the number of patients able to access NHS-funded fertility treatment. If national policy did affect this, we would need to think about what the likely impact would be and how we would account for it in our forecasts.

5.2. The proportion of cycles funded by the NHS has remained stable from 2010 to 2016; a much higher proportion of IVF cycles are NHS funded than DI cycles. In the table below, 'unknown' funding has been excluded, so total treatments may not equal the total number of chargeable treatments.

	Private (IVF and DI)	NHS (IVF and DI)	% NHS (IVF and DI)	% NHS (DI)	% NHS (IVF)
2007[3]	5,072	1,676	25%	18%	26%
2008	32,286	13,345	29%	16%	30%
2009	33,556	19,466	37%	19%	38%
2010	34,701	21,899	39%	19%	40%

[3] In 2007, funding type was not routinely collected (there were a high number of 'unknowns'

2011	36,668	22,769	38%	18%	40%
2012	36,834	22,575	38%	16%	40%
2013	37,064	23,988	39%	16%	41%
2014	38,009	24,592	39%	15%	41%
2015	39,335	25,067	39%	17%	41%
2016	40,939	26,192	39%	16%	41%

6. Summary of demographic and activity data

- There has been a steady increase in the number of chargeable cycles over time.
- The proportion of cycles funded by the NHS remained steady between 2010 and 2016.
- Most cycles occur for women aged 31 to 40 years of age, and there is constant growth in this age band.
- There has been significant growth in the number of cycles for women aged 45 to 54.
- Regions show different trends in growth rates, of which the overall impact on activity is difficult to gauge.

7. Treatment rates using ONS population estimates

7.1. Rates per capita (a rate proportional to the number of persons in a population) should be used to understand if changes in the fertility trends are driven by changes in the size of the underlying population.

7.2. The ONS produces national population estimates, provided for single year of age and regions. The population bases used in the tables excludes 18-19 and 55-57 year olds for consistency, as there are very small numbers of patients accessing treatments in these age ranges.

7.3. The population estimates used are the ONS 2016 mid-year estimates, produced in June 2017[4].

7.4. One drawback of treatment rates per capita is that, based on the data we have used for this analysis, we are assuming a constant rate of repeat treatments, whereas in actual fact, as success rates of IVF and DI continue to rise, we are likely to have fewer patients having repeat treatments.

Overall Rate

4 https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/qmis/annualmidyearpopulationestimatesqmi

7.5. The overall chargeable treatment rate per capita (for 20-54 year olds) is 0.44%, at around 0.11% each quarter (or, if we assumed each treatment was for a separate individual, 0.44% of women had fertility treatment).

7.6. This has shown a steady increase from 2007: over the past 10 years the number of treatment cycles as a % of the total female population (for women aged 20 to 54) has increased from 0.32% to 0.44%, so growth in activity cannot be explained just by the change in the population size. Although the rate remained stable between 2011 and 2012; from 2012, which represents the most recent indication of trends in the developing fertility sector, the rate has consistently increased.

7.7. Estimates suggest that the incidence of infertility in the UK population is 1:7 to 1:6 (14% to 17%). Therefore, despite the very significant increase in the amount of fertility treatment undertaken over the past 25 years, the sector is still a very long way from market capacity (even allowing for the fact that IVF is not suitable for all who have problems with their fertility).

	Population	DI	IVF	IVF or DI	DI	IVF
2007	14,813,112	3,896	43,198	0.32%	0.03%	0.29%
2008	14,932,461	3,996	45,912	0.33%	0.03%	0.31%
2009	15,016,012	3,895	49,651	0.36%	0.03%	0.33%
2010	15,122,508	3,945	52,946	0.38%	0.03%	0.35%
2011	15,233,433	4,107	55,705	0.39%	0.03%	0.37%
2012	15,289,770	4,478	55,347	0.39%	0.03%	0.36%
2013	15,321,322	4,636	56,864	0.40%	0.03%	0.37%
2014	15,358,039	4,694	58,403	0.41%	0.03%	0.38%
2015	15,403,368	4,968	59,853	0.42%	0.03%	0.39%
2016	15,419,018	5,431	62,061	0.44%	0.04%	0.40%

Change in population, and change in treatment

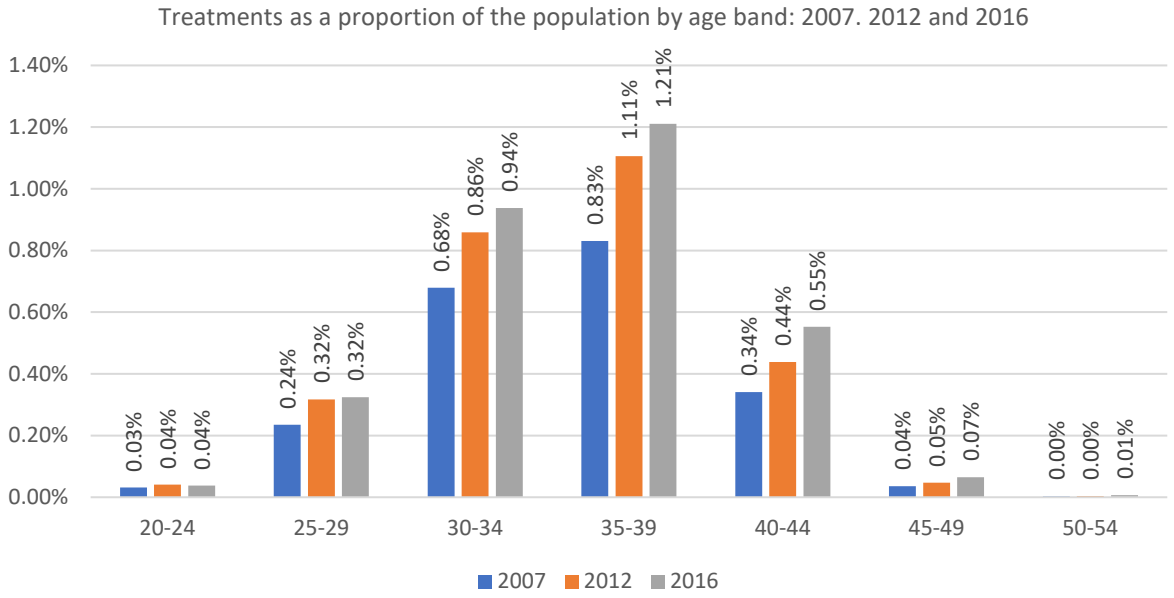
7.8. Overall, total population growth between 2007 and 2016 for 20 to 54 year olds has been +4.1%. Treatment activity, however, has increased by 43.3%, suggesting increased activity (and associated income) cannot be explained by population growth alone. This is also the case using more recent population and activity changes (e.g. between 2013 and 2016): treatment activity has increased at a greater rate than population growth.

Change period		20-24	25-29	30-34	35-39	40-44	45-49	50-54	All (20-54)
2007-2016	**Population**	2.0%	9.1%	10.9%	-8.9%	-11.8%	8.7%	24.3%	4.1%
	Treatment activity	23.0%	50.0%	53.1%	32.8%	43.2%	99.6%	205.6%	43.3%
2013-2016	**Population**	-2.3%	2.6%	1.4%	5.4%	-7.5%	-1.4%	7.1%	0.6%
	Treatment activity	-3.9%	2.4%	8.6%	12.5%	9.5%	25.8%	65.0%	9.7%

Rates by age band

7.9. The highest treatment per capita rate is for women aged 35-39 in which this treatment rate has also increased the most from 2007 (from 0.83% to 1.21%). Treatment rate per capita has increased considerably for women aged 30-34 and 40-44, whereas there does not seem to be much change for women aged 20 to 29 or 45 to 49, as a proportion of the total population.

7.10. The chart below shows treatments as a proportion of the total population within each age band.



8. Summary of treatment activity per capita

- The overall treatment rate per capita is 0.44% in 2016, which has increased steadily from 2007 (0.32%). The growth in treatment activity of 43.3% compared to a population increase of 4.1% indicates that population size is one of many factors driving increased activity.
- Rates vary considerably by age band, suggesting a more advanced forecasting model which incorporates age band trends could be developed. However, the need to do this should be balanced against the additional value gained from developing a more specified forecasting model (which does not always equate to better estimates).

9. Forecasting

Purpose and methodology

9.1. As the purpose of this paper is not to develop an advanced forecasting model, highly specified to the current context, the time series methods explored in the development of the model are simplistic, high level and described in Annex B.

Annual Forecast

9.2. The table below shows the rate forecasted using linear forecasting, exponential smoothing (default excel values), and for comparison, retaining a constant rate as seen in 2016 (0.44%).

9.3. There are minimal differences in the rate between a linear model and ETS model either short term or long term: both increase to 0.49% by 2020, and increase to 0.55% in 2025 and 0.61% in 2030. It is important to remember that current trends may not hold true when looking further than a few years into the future, so the 2025 and 2030 estimates are provided for context, as opposed to a likely outcome based on the information we currently hold.

9.4. We forecast that by 2020, the number of chargeable treatments is expected to increase to 74,919 (linear forecast) or 74,613 (ETS) with a 95% confidence range of 70,906 to 78,319.

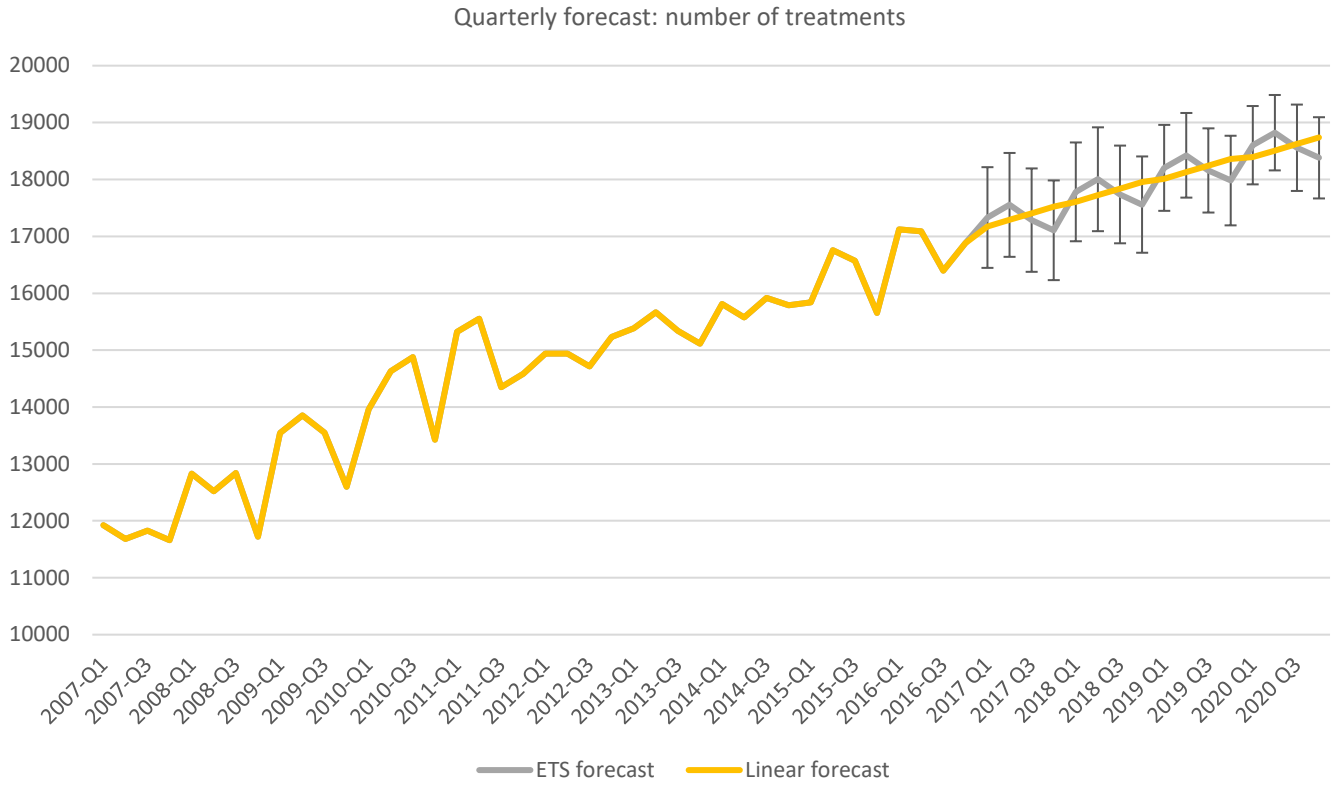
9.5. This forecast is supported by data from the first 6 months of 2017/18, during which there have been 34,564 chargeable treatments – the ETS quarterly method forecasted 34,884 treatments: an error of just -320 treatments (+0.93%).

	Total Population	IVF or DI Rate (linear)	IVF or DI Rate (ETS)	Forecast (assume constant 2016 rate)	Linear forecast	ETS Forecast	ETS confidence interval	ETS confidence interval (counts)	£ (ETS forecast) - assumes 100% IVF	£ (ETS forecast) - assumes 92% IVF, 8% DI	Lower 95% - assumes 92% IVF, 8% DI	Upper 95% - assumes 92% IVF, 8% DI
2007	14813112	0.32%	0.32%	47094	47094	47094	-	-	-	-	-	-
2008	14932461	0.33%	0.33%	49908	49908	49908	-	-	-	-	-	-
2009	15016012	0.36%	0.36%	53546	53546	53546	-	-	-	-	-	-
2010	15122508	0.38%	0.38%	56891	56891	56891	-	-	-	-	-	-
2011	15233433	0.39%	0.39%	59812	59812	59812	-	-	-	-	-	-
2012	15289770	0.39%	0.39%	59825	59825	59825	-	-	-	-	-	-
2013	15321322	0.40%	0.40%	61500	61500	61500	-	-	-	-	-	-
2014	15358039	0.41%	0.41%	63097	63097	63097	-	-	-	-	-	-
2015	15403368	0.42%	0.42%	64821	64821	64821	-	-	-	-	-	-
2016	15419018	0.44%	0.44%	67492	67492	67492	-	-	-	-	-	-
2017	*15415782*	*0.45%*	*0.45%*	*67478*	*69622*	*69309*	*0.01%*	*2009*	*5544720*	*5295208*	*5141720*	*5448695*
2018	*15412773*	*0.46%*	*0.46%*	*67465*	*71504*	*71193*	*0.02%*	*2703*	*5695440*	*5439145*	*5232636*	*5645654*
2019	*15385807*	*0.48%*	*0.47%*	*67347*	*73272*	*72963*	*0.02%*	*3249*	*5837040*	*5574373*	*5326150*	*5822597*
2020	*15335553*	*0.49%*	*0.49%*	*67127*	*74919*	*74613*	*0.02%*	*3707*	*5969040*	*5700433*	*5417218*	*5983648*
…												
2025	*15268671*	*0.55%*	*0.55%*	*66834*	*83984*	*83686*	*0.04%*	*5465*	*6694880*	*6393610*	*5976084*	*6811136*
…												
2030	*14954982*	*0.61%*	*0.61%*	*65461*	*91458*	*91173*	*0.04%*	*6664*	*7293840*	*6965617*	*6456488*	*7474747*

Quarterly Forecast

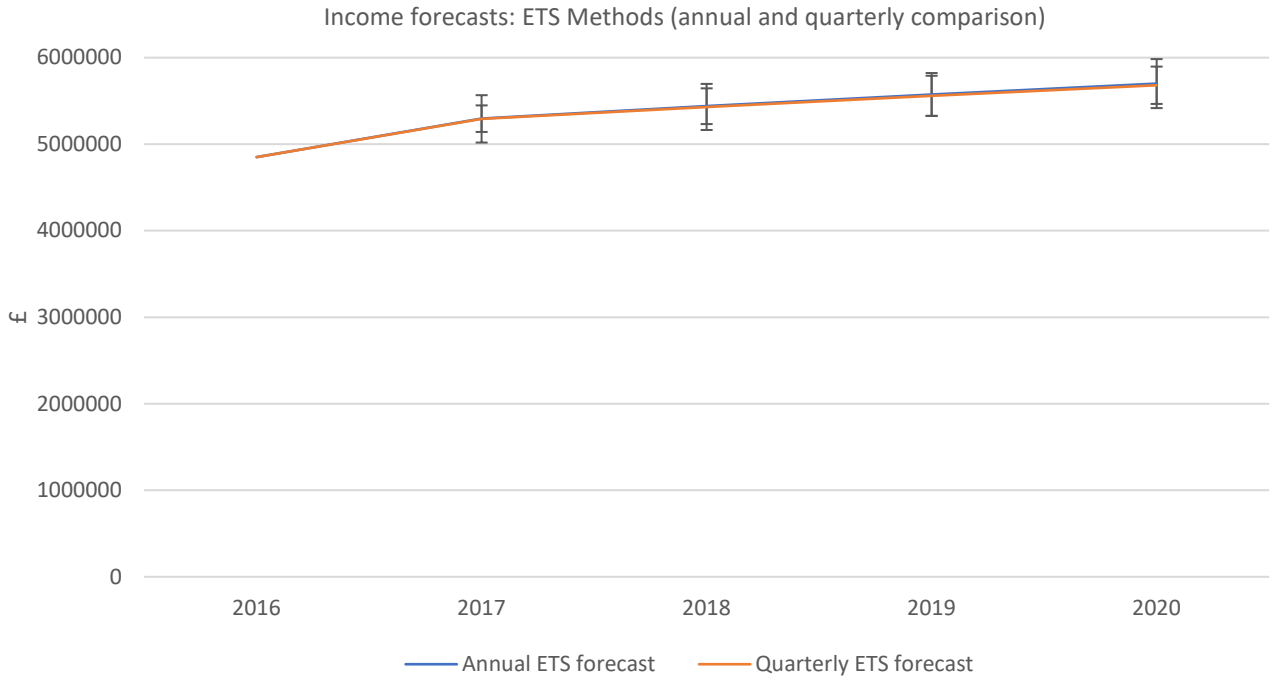
9.6. The chart below shows the rate forecasted using both linear regression and exponential smoothing (default excel values). As opposed to the annual forecast shown above, this version will provide information on how income might vary between quarters in the year, potentially allowing for better resource and business planning. We can observe from the chart the differences between the ETS model (which incorporates seasonal variation) and the linear model (which predicts only a straight line).

9.7. In 2020, aggregating each quarter, the projected number of treatments is 74263 (linear forecast) and 74361 (ETS) with a 95% confidence interval range of 71537 to 77185.



Income Forecasts

9.8. The following graph illustrates the increased income that would follow the forecast increase in treatment volumes. In 2016/17, treatment costs per cycle changes, so this may explain the 'bump' in income between 2016 and 2017 which disappears if the 2015/16 costs associated with treatments are used.



9.9. Under our model income is projected to increase from £4,850,819 in 2016 to £5,681,180 by 2020 (aggregated quarterly ETS). Over the first 6 months of this financial year we have seen growth of just over 1%. The table below provides the forecast income for the lower and upper 95% confidence intervals.

	Annual ETS forecast	Lower 95% - assumes 92% IVF, 8% DI	Upper 95% - assumes 92% IVF, 8% DI	Quarterly ETS forecast	Lower 95% - assumes 92% IVF, 8% DI	Upper 95% - assumes 92% IVF, 8% DI
2016	4,850,819			4,850,819		
2017	*5,295,208*	*5,141,720*	*5,448,695*	*5,292,686*	*5,018,945*	*5,566,428*
2018	*5,439,145*	*5,232,636*	*5,645,654*	*5,430,588*	*5,164,258*	*5,696,919*
2019	*5,574,373*	*5,326,150*	*5,822,597*	*5,559,475*	*5,328,289*	*5,790,662*
2020	*5,700,433*	*5,417,218*	*5,983,648*	*5,681,180*	*5,465,427*	*5,896,934*
…						
2025	*6,393,610*	*5,976,084*	*6,811,136*			
…						
2030	*6,965,617*	*6,456,488*	*7,474,747*			

9.10. Taking the lower 95% interval, we would still see growth of c£90k each year through to 2020 (based on 2016/17 outturn). Although very early the increase we have seen in the first 6 months of this financial year is very similar to this estimate: using the quarterly estimates, income in the first 6 months of 2017/18 has been £2,668,730, compared to a quarterly forecast of £2,665,138 (an error of £3,592, or -0.13%). The income is within the confidence interval of £2,527,770 to £2,802,505.

10. Summary of forecasts

- Both linear forecasting and exponential smoothing methods forecast increases in the number of chargeable treatments, based on historic patterns to date
- By 2020, both linear forecasting and ETS suggest the number of treatments will increase from 67492 in 2016 to between 70906 and 78319.
- Treatment income is likely to range between £5,454,427 and £5,896,934 by 2020, with the lower estimate for growth still providing an annual increase in income of c2% per annum.
- The forecasting methods are intentionally simplistic to account for this early exploratory work which will inform whether we invest further resources into developing more advanced models.

11. Next steps

11.1. It is important to note that forecasting isn't an exact science, but if done correctly, can predict with some accuracy the trends that tend to occur when dealing with volatile metrics such as treatment activity.

11.2. This report provides evidence for the factors which affect treatment and income activity across the fertility sector, in a way not previously analysed. It highlights the seasonal pattern across the year, and that the growth in treatment rates (per capita) vary by region and age band.

11.3. The combined impact of the factors discussed in this document indicate a likely increase in demand for fertility treatment and therefore chargeable activity over the next 5 years. More advanced modelling, accounting for differing trends within these factor levels could provide more sophisticated forecasts, but as the current model in the first 6 months of 2017/18 is accurate to within 99.8%, there is an open question as to what additional value this would bring. However, we are keen to add further ONS data, relating to the upward trend in the age of first live birth for the UK population, which is also likely to demonstrate a correlation with the growth in treatment over the past 10 years.

11.4. Our work to date has considered the data in terms of demand, we are yet to consider the impact of supply and policy in relation to how that base demand translates through to activity. In such a rapidly developing sector we must consider the possible impact that national policy changes may have on patterns of activity (e.g. NHS commissioning decisions) as well the potential impact of price and those seeking treatment abroad. In short, increased demand may not necessarily lead to increased activity if barriers to access increase alongside.

11.5. We will look to test the validity of this model on our emerging 2017 data to determine if the results from the analysis provide realistic estimates of activity and income.

11.6. In terms of fee changes we propose keeping fees for 2018/19 unchanged. The sector appreciates stability in terms of our fees and the information presently at hand does not indicate we could reduce our fees materially for 2018/19 based on forecast increased activity. We propose to bring a further update to the Authority in mid-2018, which will allow us to combine our improved income forecast model with a three-year financial plan and a proposal for future fees from April 2019.

Annex B: Forecast methods

1. Population forecast

1.1. Future treatment activity rates have been forecast, so that we can apply the same model to variants of the underlying (ONS) dataset, should we wish to model different population growth scenarios. The ONS population projections provide an indication of the future size and age structure of the population based on mid-year population estimates and a set of assumptions of future fertility, mortality and migration and are available at regional, and national level. These projections are widely used for resource allocation and planning. The 2014-based ONS national population projections[5] were used in this analysis (released May 2016).

2. Time Series Methods

2.1. Time series methods are forecasting techniques that base the forecast solely on the history of the item you are forecasting. These forecasting models are best suited to shorter-term forecasting due to their assumption that future patterns and trends will resemble current patterns and trends. This is a reasonable assumption in the short term but becomes more tenuous the further out you forecast. Both linear forecasting and exponential smoothing models are appropriate when you can assume a reasonable amount of continuity between the past and the future.

3. Linear Forecasting

3.1. Linear trend forecasting is used to impose a linear line of best fit to time series historical data. It is a simplistic forecasting technique that can be used to predict a variable.

4. Exponential Smoothing (ETS)

4.1. Exponential smoothing is a time series forecasting technique. Exponential Smoothing methods are a popular way to forecast and are among the leading methods that have become industry standards. The main advantages of using the ETS method are the ability to detect seasonality patterns and confidence intervals.

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5 https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/datasets/localauthoritiesinenglandtable2