Number of **Extra** Patients to Be Seen to Achieve a Particular Maximum Waiting Time

Definition of Abbreviations:

Current and Future Maximum Wait = $T_{\text{Current Maximum Wait}}$ and $T_{\text{Future Maximum Wait}}$

Current and Future Nominal Wait = $T_{\text{Current Nominal Wait}}$ and $T_{\text{Future Nominal Wait}}$

Activity and Demand = A and D

Shortest wait experienced by a routine patient = T_{first}

Change in the number of patients on the waiting list = Δ

Conversion of Maximum Wait to a Nominal Wait:

Current ($T_{\text{Current Maximum Wait}}$) and Future ($T_{\text{Future Maximum Wait}}$) Maximum Wait are known as is the Current Nominal Wait ($T_{\text{Current Nominal Wait}}$). It is the Future Nominal Wait ($T_{\text{Future Nominal Wait}}$) that is required for further calculation.

Three methods are available to estimate $T_{\text{Future Nominal Wait}}$. Remember that all are approximations and it is therefore best to take the number giving the highest final reduction in the total number waiting.

1. Half the Future Maximum Wait;
$$T_{\text{Future Nominal Wait}} = 0.5 \times T_{\text{Future Maximum Wait}}$$
2. Using the ratio of current values;
$$T_{\text{Future Nominal Wait}} = T_{\text{Current Nominal Wait}} \times (T_{\text{Future Maximum Wait}} / T_{\text{Current Maximum Wait}})$$
3. Using the Routine Nominal Wait;
$$T(\text{routine})_{\text{Future Nominal Wait}} = 0.5 \times (T_{\text{Future Maximum Wait}} + T_{\text{first routine}}),$$

where $T_{\text{first routine}}$ is the waiting time for the first (or earliest) routine patient removed from the waiting list. [Remember to calculate the waiting time in years (i.e. 1.25 years = 15 months) as the units of activity are usually in years]

For methods 1 and 2 use **Total** activity to calculate the required extra patients to be seen, while, for method 3 use only the **Routine** activity to calculate the extra routine patients to be seen (in addition to the expected number of urgent + soon patients; remember to add one standard deviation to the expected number of urgent + soon to account for variation).

Calculating the Change in Number Waiting:

Having determined our future nominal waiting time we can then calculate the additional patients to be seen (Δ) as follows:

The current nominal wait is equivalent to the current number waiting (N_C) divided by the current activity (A_C), $T_{Current\ Nominal\ Wait} = N_C/A_C$

We adjust the current nominal wait by reducing the number of patient waiting to be seen (i.e. $N_C - \Delta$), however, to achieve this the current activity is replaced by demand (D) plus the change (i.e. $A_C \rightarrow D + \Delta$).

We therefore have the future nominal wait as :

$$T_{Future\ Nominal\ Wait} = (N_C - \Delta)/(D + \Delta)$$

After re-arranging we obtain the value of the change as:

$$\Delta = [N_C - (T_{Future\ Nominal\ Wait} \times D)]/[1 + T_{Future\ Nominal\ Wait}]$$

However, if we think forward to the year following the change in waiting time we see that the activity will no longer be (D + Δ) but will reduce back to the demand (D).

The value of the change required to deliver an on-going reduction in waiting time is therefore larger and has a value of:

$\Delta = (N_C - T_{Future\ Nominal\ Wait} \times D)$, i.e. we no longer divide by $(1 + T_{Future\ Nominal\ Wait})$ but just divide by 1

If we use the routine nominal wait the both demand and number waiting must be for routine patients only. Please remember that all values must be in years. If you mix months and years you will get a nonsense result.

> **Important Point:** The number of patients waiting should **always** be **all** patients on the waiting list including booked admissions, deferred and suspended patients. If you exclude these groups of patients you will arrive at a false view of your real (future) workload and badly underestimate the numbers of patients needing to be seen to achieve any given (maximum) waiting time.

Calculation Direct From the Number Waiting Profile:

There is one final method for estimating the number of extra patients needing to be seen to achieve a shift in waiting time. This method involves looking at the number of patients waiting split by month. You will recall that a well run waiting list shows an exponential decline with time, i.e. a rapid decrease in number waiting in months 0 to 6 followed by a long tail to the maximum waiting time. Most problem waiting lists begin to hump in the opposite direction so that high numbers of patients are coming up to the maximum time barrier. It becomes logistically difficult to deliver the maximum waiting time since any fluctuation in emergency demand will lead to cancellations and pressure on urgent and soon admissions.

To go from one extreme to the other is probably more than any purchaser is able to fund, hence, we can go half way and assume a straight line relationship.

Months Waited (up to)	Number Waiting (A)	Straight Line (B)	Number To Be Seen (A – B)
1	132	132	0
2	128	120	8
3	100	108	-8
4	103	96	7
5	97	84	13
6	89	72	17
7	80	60	20
8	57	48	9
9	47	36	11
10	37	24	13
11	27	12	15
12	17	0	17
13	9		9
14	4		4
15	0		
Total	**927**	**792**	**135**

As can be seen the required number of additional patients (135) is many more than simply determining the number of patients waiting longer than the maximum wait (twelve months in this example), i.e. 13 patients (4 + 9 =13).

Remember that the 135 extra patients is in addition to the demand, where, the demand is last years activity plus any increase in the number waiting over the previous year or is the average demand forecast using the method given in the seminar.

In conclusion, the commitment to reducing maximum waiting time involves the input of considerable resources.