**Methods**

Data obtained from <https://publichealthscotland.scot/publications/nhs-waiting-times-stage-of-treatment/stage-of-treatment-waiting-times-inpatients-day-cases-and-new-outpatients-30-june-2022/clinical-prioritisation-dashboard/>. Data was published on 06/09/2022 and covers all elective orthopaedic inpatient and daycase treatment from July 2021 to June 2022, including a breakdown by individual health boards. This data contains details of all patients added to the waiting list for treatment, the number of patients currently waiting (including length of wait), and the number of patients admitted for treatment. For the purposes of this study, we have focused on “routine” patients, i.e. those previously classified by the Federation of Surgical Speciality Associations (FSSA) as P3 and P4 priority classifications. 1

Percentage of 2019 activity

Orthopaedic elective 2019 activity (including all patients, not just those classified as routine) was first extracted from the Public Health Scotland data for new additions to the waiting list and new admissions for treatment. The June 2022 proportion of P3/P4 patient activity was then used as a reference (71%) and applied to the overall 2019 volumes to provide a detail on activity that was related to this routine category of patients.

We then calculated the percentage activity for new additions to the waiting list by taking the number of new P3/P4 additions over 1 year up to end June 2022 and dividing this by estimated attributable number of P3/P4 patients added to the waiting list in 2019. This was then x100 to provide the relative percentage. The process was then repeated regarding admissions for treatment to provide the relative percentage of operative activity for 1-year up to June 2022 in routine patients compared to 2019 values.

Across all elective orthopaedic activity, the stated 2019 monthly average for operative admissions and additions were 3817 and 5004, respectively.

Predicted waiting times for orthopaedic surgery

Predicted waiting times are calculated for a patient added to the waiting list for routine (P3&P4) orthopaedic surgery July 2022. Calculations are based on the previous 1-year historic activity. The volume of routine patients currently waiting for surgery as of the end June 2022 was then calculated. This was divided by the historic activity in 1-year to give the amount of time taken to clear all waiting patients, so that a theoretical patient would be next in line for surgery. This was performed for routine patients across Scotland, and for within each individual health board.

We also performed adjustment for the potential impact of upcoming available orthopaedic operating capacity within the National Treatment Centres (NTCs) on predicted national operative volume. This was calculated as the predicted volume of routine operations per year (based on 1-year historical activity) added to the 1-year predicted orthopaedic activity from the four 2023 opening NTCs. This totals 3746 cases (71% of 5276 –P3&P4 cases as a proportion of total volume orthopaedic activity performed across Scotland in June 2022). The total (unadjusted) NTC capacity is as follows: 542 NHS Fife; 1086 NHS Forth Valley; 1506 NHS Highland; 3436 Golden Jubilee National Hospital.

For each individual health board in scenarios where additional NTC capacity was present we stratified this according to a weighting criterion based on the predicted unadjusted waiting times (i.e., the health boards with the longest projected wait had more NTC capacity applied to their activity).

The presented sensitivity estimates utilised the following information:

* Best-case scenario – full return to pre COVID activity by November 2022, with full additional NTC Capacity. A monthly average of 1-year historical activity was used as the basis for activity in July – October 2022. Pre-COVID activity levels were calculated as detailed above.
* Current scenario – A monthly average of 1-year historic activity used from July 2022 to June 2023. From July 2023 onwards the monthly average activity included full additional projected NTC capacity.
* Cautious scenario – A monthly average of 1-year historic activity used from July 2022 to June 2023. From July 2023 onwards the monthly average activity included half the projected additional NTC capacity. In this scenario we hypothesised the potential for issues with recruitment of staff to NTCs given current wider NHS staffing pressures.
* Worst-case scenario – A monthly average of 1-year historical activity used as a prediction of future activity alone. In this scenario we hypothesised the potential for extra NTC capacity to be cancelled out by deterioration in other NHS activity (for example due to urgent care bed pressures, or migration of existing staff to NTCs leaving a deficit in pre-existing services).
* The worst individual health board wait was taken from individual health board calculations for each of the included scenarios.

Annual case deficit

The annual case deficit case been calculated by the total number of new routine (P3&P4) waiting list additions over the last 1-year compared to the number of operations performed on routine cases over the last 1-year. Again, adjustment has been performed based on calculation of potential additional P3&P4 activity from the NTCs (as detailed above). Additional calculations utilising a return to pre-COVID activity (both additions and admissions as detailed above) were also performed.

We then calculated the amount of additional time this would add to the waiting list for each year that this case deficit continued. This was determined as the total case deficit per year divided by the number of routine cases undertaken per year (including additional predicted activity from the NTCs and full pre-COVID activity).

Feasibility of achieving current Scottish Government targets of a 1-year wait for surgery by September 2024

Current targets have been taken from the Scottish Government website following their release on 06/07/2022: <https://www.gov.scot/news/new-national-targets-to-tackle-long-waits-for-planned-care/>. This included a target to limit patients to no more than a 1-year wait for inpatient and daycase cases in most specialities by September 2024. This therefore means a need for no patient added to the waiting list as of September 2023 waiting more than 1-year (to enable completion of their operation by September 2024).

We therefore calculated potential predicted waits for patients added to the waiting list September 2023 in order to determine the feasibility of achieving the current target. This included calculations based on historical 1-year routine operative activity, and then 25% incremental increases up 100% (2x) this baseline. We also included the scenario of a return to pre-COVID activity and full additional NTC capacity.

To achieve this, we calculated the number of patients additional patients on the waiting list per month (predicted new additions to the wait list minus the predicted number of operated patients) out to September 2023, dividing this by the predicted number of patients admitted for surgery per month to calculate the wait per month. This was then divided by 12 to give the annual wait. This was based on a historical baseline of 1415 routine patients per month, with adjustment for the potential incremental increases (for example 2830 for a 100% increase). Pre-COVID activity was determined based on 2019 activity (both new additions to the waiting list and numbers of operations performed) for routine patients as detailed above.

References

1.     **Federation of Surgical Specialty Associations.** Clinical Guide to Surgical Prioritisation in the recovery from the Coronavirus Pandemic , 2022. <https://fssa.org.uk/_userfiles/pages/files/covid19/prioritisation_master_28_01_22.pdf.>