

■ ARTHROPLASTY

The feasibility of achieving Elective Care Framework targets for total hip arthroplasty and total knee arthroplasty in Northern Ireland



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Aims

Waiting times for arthroplasty surgery in Northern Ireland are among the longest in the NHS, which have been further lengthened by the onset of the COVID-19 global pandemic in March 2020. The Department of Health in Northern Ireland has announced a new Elective Care Framework (ECF), with the framework proposing that by March 2026 no patient will wait more than 52 weeks for inpatient/day case treatment. We aimed to assess the feasibility of achieving this with reference to total hip arthroplasty (THA) and total knee arthroplasty (TKA).

Methods

Mathematical modelling was undertaken to calculate when the ECF targets will be achieved for THA and TKA, as well as the time when waiting lists for THA and TKA will be cleared. The number of patients currently on the waiting list and percentage operating capacity relative to pre-COVID-19 capacity was used to determine future projections.

Results

As of May 2021, there were 3,757 patients awaiting primary THA and 4,469 patients awaiting primary TKA in Northern Ireland. Prior to April 2020, there were a mean 2,346 (2,085 to 2,610) patients per annum boarded for primary THA, a mean 2,514 (2,494 to 2,514) patients per annum boarded for primary TKA, and there were a mean 1,554 primary THAs and 1,518 primary TKAs performed per annum. The ECF targets for THA will only be achieved in 2030 if operating capacity is 200% of pre COVID-19 pandemic capacity and in 2042 if capacity is 170%. For TKA, the targets will be met in 2034 if capacity is 200% of pre-COVID-19 pandemic capacity.

Conclusion

This modelling demonstrates that, in the absence of major funding and reorganization of elective orthopaedic care, the targets set out in the ECF will not be achieved with regard to THA and TKA. Waiting times for THA and TKA surgery in Northern Ireland are likely to remain greater than 52 weeks for most of this decade.

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Introduction

Waiting times for arthroplasty surgery in Northern Ireland are among the longest in the NHS. Even prior to COVID-19, a historic lack of capacity has meant that the number of patients being added to the waiting list exceeded the number of operations being performed, leading to a continued deterioration in waiting times. The onset of the

COVID-19 global pandemic in March 2020 has further lengthened the waiting lists due to widespread cancellation of elective orthopaedic services.¹

As the COVID-19 pandemic has progressed and successful widespread vaccination has been undertaken, there has been a gradual return of elective orthopaedic services. However, activity levels remain significantly

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Table 1. Year in which Elective Care Framework targets will be achieved based on percentage theatre capacity compared to pre-COVID-19 capacity.

Joint	Boarded pre-COVID-19, n	Theatre capacity pre-COVID-19, n	200% theatre capacity, n (year)	170% theatre capacity, n (year)	150% theatre capacity, n (year)
THA	2,346	1,554	3,108 (2030)	2,642 (2042)	2,331 (N/A)
TKA	2,514	1,518	3,036 (2034)	2,581 (3014)	2,277 (N/A)

N/A, not applicable; THA, total hip arthroplasty; TKA, total knee arthroplasty.

curtailed and are unlikely to return to pre-pandemic levels for months, and possibly years, further impacting the ability to clear the waiting list. Consequently, numerous surgical colleges and bodies have published guidelines regarding prioritization of cases following resumption of elective operating.²

The long waiting times faced by patients across surgical specialties in Northern Ireland has resulted in the announcement of a new Elective Care Framework (ECF) by the Department of Health in Northern Ireland, with the framework proposing that by March 2026 “no patient will wait more than 52 weeks for a first outpatient appointment or inpatient/day case treatment, and no longer than 26 weeks for a diagnostics appointment.”³ It is unclear if this 52-week target refers to the time from initial referral to surgical treatment, or the time from when the patient is placed on the waiting list until surgical treatment.

The primary aim of this study was to assess the feasibility of achieving the goals outlined in the ECF with reference to total hip arthroplasty (THA) and total knee arthroplasty (TKA) (i.e. the time from when the patient is placed on the waiting list until surgical treatment is less than 52 weeks). We aimed to model the time taken to meet ECF targets, as well as the time to clear the waiting list completely. We also assess the capacity for THA and TKA surgery following resumption of elective orthopaedic services post-COVID-19.

Methods

A freedom of information request was submitted to the Northern Ireland Health and Social Care Board on 26 May 2021 to ascertain the number of patients currently waiting on THA and TKA across the NHS in Northern Ireland. Each of the three trusts providing elective orthopaedic services (Belfast Health and Social Care Trust, Southern Health and Social Care Trust, and Western Health and Social Care Trust) were then contacted to determine the number of patients added to the waiting list per year in the two years prior to the onset of the COVID-19 pandemic. The National Joint Registry (NJR) of England, Wales, and Northern Ireland was used to determine the number of primary THAs and TKAs performed across Northern Ireland’s health trusts in the three years prior to the onset of the COVID-19 pandemic as an estimate of annual pre-COVID-19 capacity (THAs performed for fractured neck of femur were excluded).⁴

Mathematical modelling was undertaken to calculate when the ECF targets will be achieved, as well as to determine when the waiting lists for THA and TKA would be cleared completely. The mean number of patients added to the waiting list annually in the two years prior to the onset of the COVID-19 pandemic was calculated and used as an estimate of the likely ongoing number of patients added to the waiting list per year. Although the demand for hip and knee arthroplasty has shown a steady increase over time and is predicted to continue to rise, we did not factor ongoing increased demand in our calculations as we did not have accurate information relating to the degree of increasing demand in Northern Ireland. The number of new patients boarded was added to the number of patients currently on the waiting list on an annual basis for future years. The number of patients remaining on the waiting list was then calculated based on theatre capacity, if operations were to resume at 25%, 50%, 75%, 100%, 120%, 150%, 170%, or 200% capacity.

To define the realistic capacity following the resumption of elective orthopaedics post-COVID-19, the three trusts were asked to provide the number of primary THAs and TKAs performed in the time period of August 2020 to May 2021. This time period was chosen as it was a period in which there was a relative restoration of elective orthopaedic services in Northern Ireland (the overall number of elective theatres running approached 40% of pre-pandemic levels).

Results

As of May 2021, there were 3,757 patients awaiting primary THA and 4,469 patients awaiting primary TKA across the health trusts providing elective orthopaedic services in Northern Ireland.

In the 24 months prior to April 2020, there were 4,692 patients (mean 2,346 patients/annum) boarded for primary THA and 5028 patients (mean 2,514 patients/annum) boarded for primary TKA in Northern Ireland. In the 36 months prior to April 2020, there were a mean 1,554 primary elective THAs and 1,518 primary elective TKAs performed per annum (THAs performed for acute neck of femur fracture were excluded). This means that the number of patients boarded for primary THA per annum was 792 cases (51%) in excess of service capacity. The number of patients boarded for primary TKA per annum was 998 cases (65.7%) in excess of service capacity.

THA Wait List: Time Needed to Clear Backlog

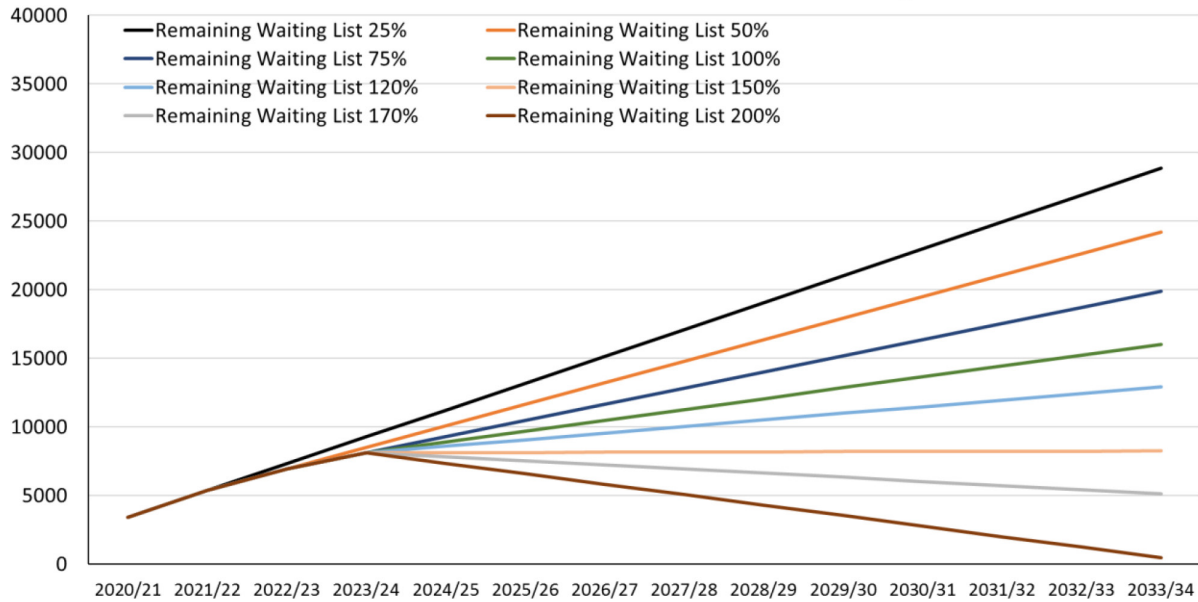


Fig. 1

Total hip arthroplasty wait list time, and theatre capacity needed to clear waiting list.

TKA Wait List: Time Needed to Clear Backlog

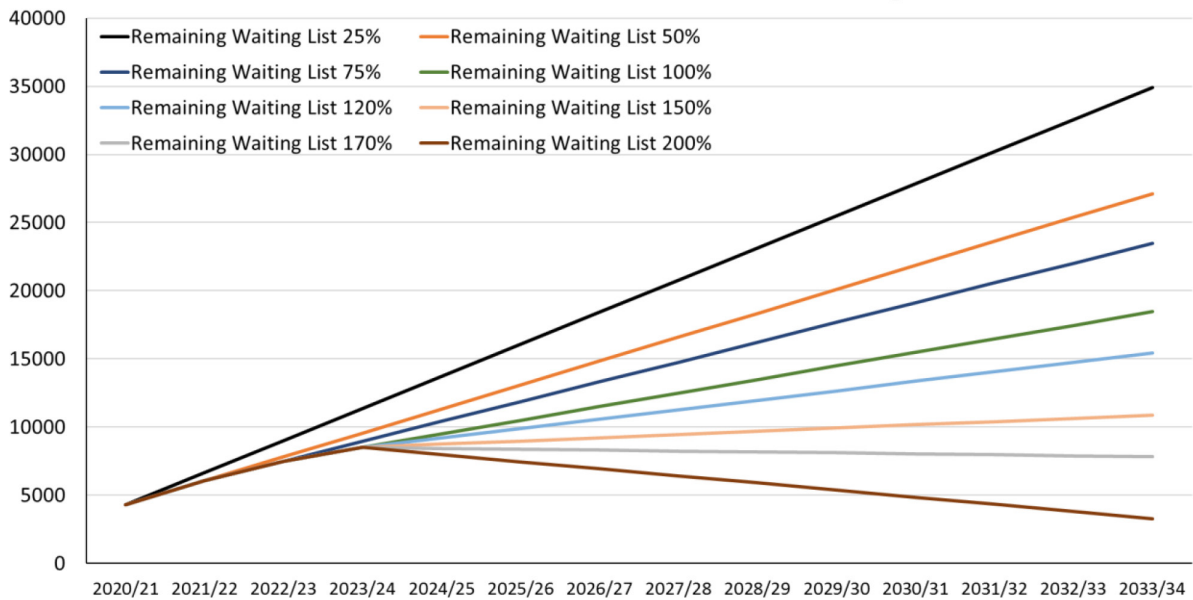


Fig. 2

Total knee arthroplasty wait list time, and theatre capacity needed to clear waiting list.

Table I outlines the year in which the ECF targets (when a patient is on the waiting list for no longer than 52 weeks) will be achieved, based on percentage theatre capacity compared to pre-COVID-19 capacity. For the ECF targets to be achieved, because of the significant number of patients already on the waiting list, annual theatre capacity must exceed the number of patients who will be added to the waiting list to clear the backlog. At the point when annual theatre capacity equals the number of

patients remaining on the waiting list, the ECF targets will be achieved. These calculations also assume that the relative discrepancy in TKA versus THA capacity versus the number of patients added to the waiting list continues.

Figures 1 and 2 demonstrate the numbers remaining on the waiting list based on the percentage theatre capacity. The THA waiting list will only be cleared completely during 2033/34 if theatres run at 200% of pre-COVID-19 capacity. This is assuming that the rate

of boarding patients for THA surgery remains steady at 2,346 year-on-year. The TKA waiting list will not be cleared by 2034 despite modelling theatres running at 200% of pre-COVID-19 capacity. This is again based on the assumption that the rate of boarding patients for TKA surgery remains steady at 2,514 year on year.

Elective orthopaedic surgical capacity was found to be significantly reduced post-pandemic compared to the previous pre-pandemic year. Capacity following resumption of elective orthopaedics in August 2020, post-COVID-19 was 22% of pre-COVID-19 THA capacity (355 THAs post-COVID-19 vs 1624 pre-COVID-19), and 11% of pre-COVID-19 TKA capacity (162 TKAs post-COVID-19 vs 1,518 TKAs pre-COVID-19).

Discussion

These data show that, in the absence of major funding and reorganization of elective orthopaedic care, the targets set out in the ECF will not be achieved with regard to hip and knee arthroplasty. These targets state that by March 2026 no patient in Northern Ireland will wait more than 52 weeks for a first outpatient appointment or inpatient/day case treatment, and no longer than 26 weeks for a diagnostics appointment.³ Our models show that if operating capacity is 200% of pre-COVID-19 capacity, the ECF targets for THA will be met in 2030 and at 170% capacity the targets for THA will be met in 2042. The ECF targets for TKA will be met in 2034 if capacity is 200% of pre-COVID-19 capacity. Capacity in the time period from August 2020 to May 2021 was found to be 22% and 11% pre-COVID-19 capacity for THA and TKA, respectively.

The present data highlights that prior to the onset of the COVID-19 pandemic (April 2017 to March 2020), the number of patients added to the waiting list for THA and TKA surgery in Northern Ireland significantly exceeded surgical capacity, resulting in ongoing deterioration in waiting times. Furthermore, the number of elective orthopaedic surgery procedures performed in Northern Ireland since the onset of the COVID-19 pandemic remains significantly reduced compared to pre-pandemic levels, and this will result in further significant increases in waiting times for patients. The significantly reduced operative capacity following the resumption of elective orthopaedics after the onset of the COVID-19 pandemic is concerning given the substantial number of patients awaiting surgery, the majority of whom will be suffering significant pain which will negatively impact upon their quality of life (QoL). It is currently unclear when elective orthopaedic capacity will return to pre-COVID-19 levels.

As an example, if capacity for THA was 25% of pre-pandemic levels, then a patient boarded in June 2021 will still have 2,539 patients ahead of them on the waiting list in three years time. If capacity for TKA was 25% of pre-pandemic levels, then a patient boarded in June 2021 will

still have 3,556 patients ahead of them on the waiting list in three years time.

The demand for hip and knee arthroplasty has shown a steady increase over time and is predicted to continue to rise considerably as patients live longer and lead more active lives.⁵⁻⁷ The figures presented here are based on the number of patients boarded in the two years prior to the onset of the COVID-19 pandemic. In reality, the demand for arthroplasty surgery is likely to exceed these figures significantly given there are long waiting times for a first outpatient consultant appointment, meaning there is likely to be a large unmet burden of disease in the community. The true need for THA and TKA surgery within Northern Ireland is therefore difficult to accurately quantify.

It is well known that end-stage arthritis significantly impacts upon patients' QoL. Clement et al⁸ reported a significant decline in the QoL scores of patients waiting on THA and TKA surgery since the onset of the COVID-19 pandemic, with 35% of THA and 22% of TKA patients waiting on surgery having a EuroQol five-level dimension health state "worse than death". Given waiting lists in Northern Ireland were already substantial prior to the onset of the COVID-19 pandemic, it is likely that a significant proportion of those on the waiting list have a major reduction in QoL due to their arthritis. This decline in QoL correlates with the increased opioid prescription for patients awaiting arthroplasty surgery seen since the onset of the COVID-19 pandemic, as reported by Farrow et al.⁹ It is important to note that the decline in preoperative function and QoL is not benign given previous research has highlighted the association with decreased postoperative outcomes and lower patient satisfaction.^{10,11}

End stage arthritis is associated with increasing age, with the median age at primary THA in the NJR being 69 years (interquartile range (IQR) 61 to 76) and 70 years (IQR 63 to 76) for primary TKA.¹² Remaining life expectancy for a male aged 70 to 74 years in Northern Ireland is 14.3 years, and for a female aged 70 to 74 years it is 16.6 years. For a male aged 80 to 84 years, life expectancy is 8.2 years, and for a female aged 80 to 84 years it is 9.6 years.¹³ Given the length of waiting lists and median age at time of surgery, it is therefore likely that elderly patients will spend a significant proportion of their remaining life on the waiting list, with a proportion of these patients dying prior to their surgery. This is concerning given the potentially significant pain and deterioration in QoL experienced by patients while awaiting surgery.

A limitation of this paper is that the modelling does not account for patients who seek arthroplasty surgery in the private sector, who die on the waiting list, or the use of private healthcare/waiting list initiatives by the NHS to help clear the backlogs. Additionally, the capacity for elective orthopaedic surgery in Northern Ireland

has fallen significantly since August 2021, with current theatre capacity approximately 5% of pre-pandemic levels. This means the number of patients on the waiting list will have increased further since the mathematical modelling was undertaken.

Addressing the waiting lists for THA and TKA surgery in Northern Ireland is going to be an extremely challenging task. With the ongoing high prevalence of COVID-19 in the community, it is likely to be a considerable period of time before surgical activity approaches the levels performed prior to the onset of the COVID-19 pandemic. Expansion of surgical capacity will be required to clear the waiting lists and to cope with increasing demand for lower limb arthroplasty surgery. This will require investment in recruiting additional orthopaedic surgeons, theatre nurses, ward nurses, anaesthetists, operating department practitioners, physiotherapists, occupational therapists, and medical administrative staff, among others. There is also likely to be a need for more ward and theatre space to allow for increased surgical capacity. The COVID-19 pandemic is likely to result in long-lasting changes to healthcare provision. Decreased capacity within hospital wards is to be expected to allow for greater social distancing, as well as greater emphasis on enhanced recovery and fast-track arthroplasty surgery to increase service efficiency. The information contained outlined here can help guide the resources required to achieve the ECF targets.

In summary, waiting times for THA and TKA surgery in Northern Ireland are likely to remain greater than 52 weeks for most of this decade. Significant investment to increase capacity, combined with reconfiguration of services to establish efficient arthroplasty pathways, is imperative to ensure that the waiting lists are reduced in line with Department of Health targets.



Take home message

- Waiting times for arthroplasty surgery in Northern Ireland are among the longest in the National Health Service.
- Waiting times for total hip arthroplasty (THA) and total knee arthroplasty (TKA) surgery in Northern Ireland are likely to remain greater than 52 weeks for most of this decade.
- In the absence of major funding and reorganisation of elective orthopaedic care, the targets set out in the Elective Care Framework will not be achieved with regard to THA and TKA.

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