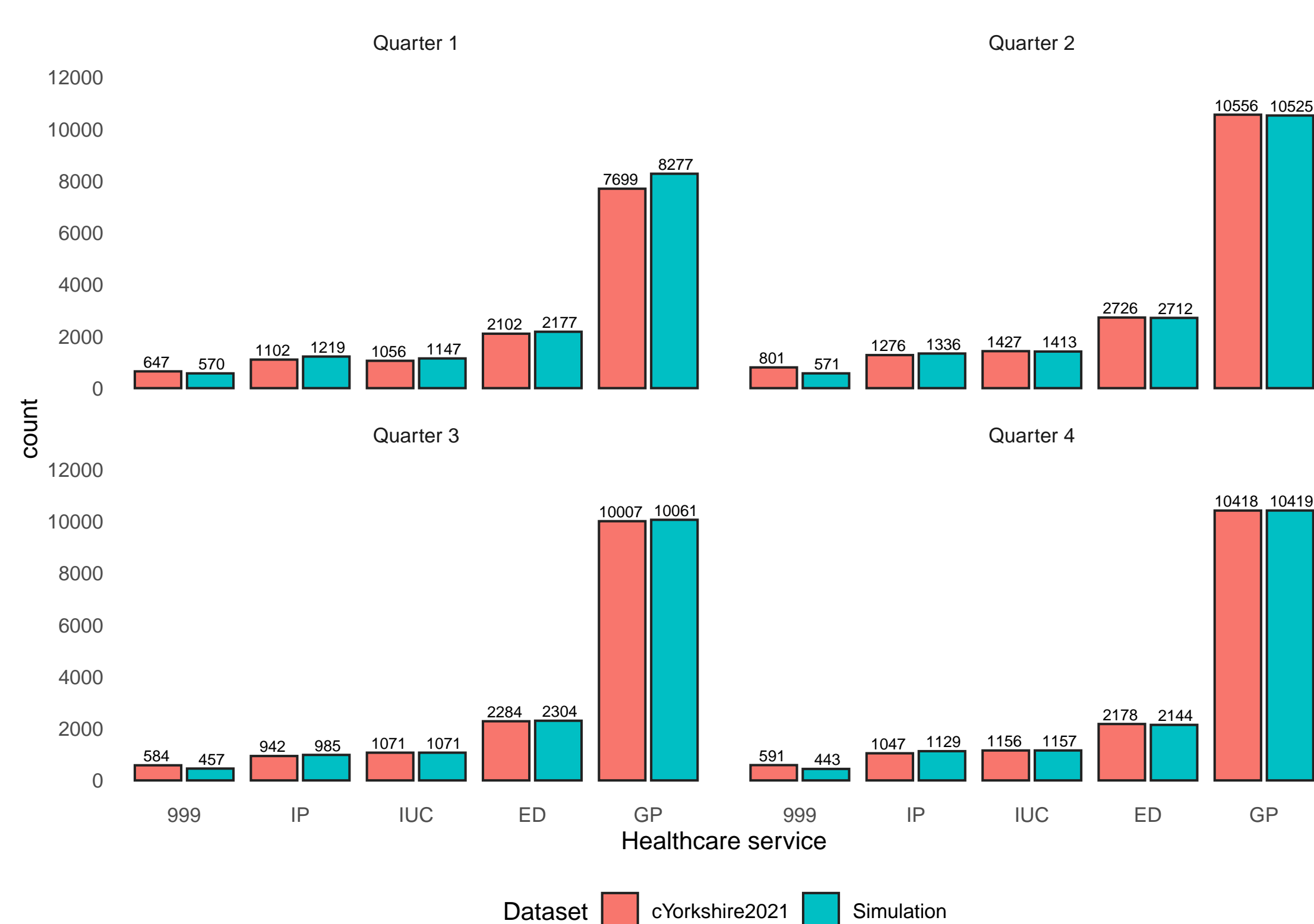


Timely contact with a primary care service after a 111 call would reduce subsequent 999, 111 and ED contacts, but requires almost double current primary care service capacity to achieve

Modelling 111 demand for primary care services using discrete event simulation

Background: Almost half of the 16,650,745 calls to NHS 111 each year are triaged to a primary care disposition. However, there is evidence that contact with a primary care service occurs in less than 50% of cases and triage time frames are frequently not met. This can result in increased utilisation of other healthcare services.

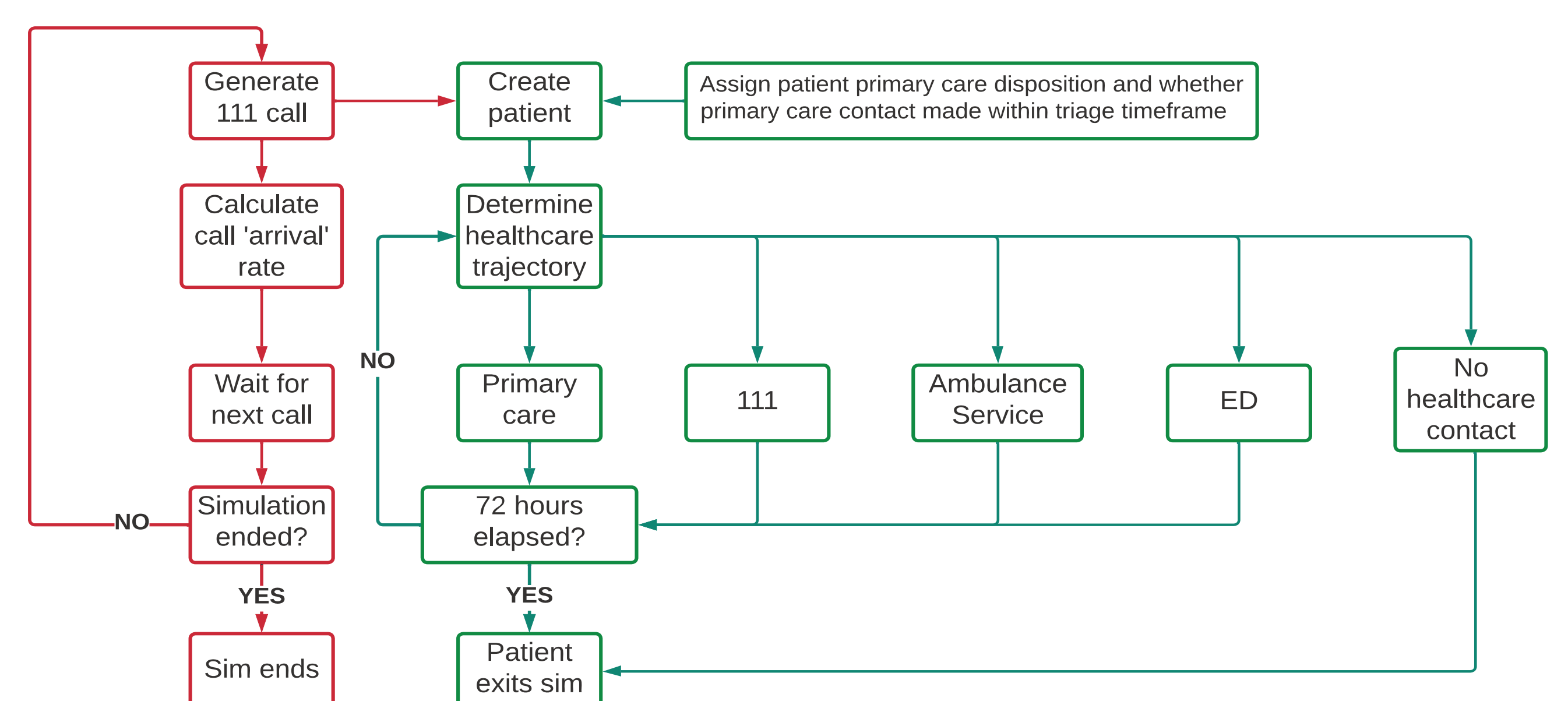
Result 1: The simulation tended to underestimate 999 call activity and overestimate other healthcare service activity. Primary care, ED attendance and subsequent 111 call activity were most closely simulated.



Result 2: Ensuring a timely contact with a primary care service would lead to a significant reduction in 999, 111 and ED contacts. However, achieving this requires almost doubling current primary care service provision.

Healthcare Service	Simulation (mean, 95%CI)	What if (mean, 95%CI)
Ambulance service (999)	2,042 (2,032–2,051)	1,593 (1,584–1,602)
Emergency department (ED)	9,337 (9,319–9,355)	8,228 (8,213–8,244)
Primary care (GP)	39,283 (39,237–39,328)	77,030 (76,964–77,097)
In-patient (IP)	4,668 (4,654–4,681)	4,620 (4,607–4,632)
111 (IUC)	4,789 (4,771–4,806)	3,074 (3,061–3,087)

Methods: Data from the Connected Yorkshire research database, consisting of all 111 calls made in 2021 by callers registered with Bradford or Airedale GP who were triaged to a primary care disposition, and subsequent healthcare system access in the 72 hours after the index 111 call, were used to develop a model and Discrete Event Simulation in Python, using the SimPy package (see figure on right). We simulated a hypothetical (what if?) scenario whereby all 111 calls with a primary care disposition received a timely primary care contact.



Limitations: This is a simple working model, and does not take account of factors that have previously been associated with healthcare access decisions. The model requires more extensive validation and verification than the simple 'black box' validation described here. The data that informed the model only covers a discrete region in West Yorkshire, which may affect generalisability. In addition, it is based on data collected in 2021, during the pandemic, which may not be representative of the current healthcare trajectory for patients who call 111.



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