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1 **A classification of primary care streaming pathways in UK emergency departments:**
2 **findings from a multi-methods study comprising cross-sectional survey; site visits with**
3 **observations, semi-structured and informal interviews**

4

5 **Introduction**

6 In response to rising demand and overcrowding at UK emergency departments models of
7 service have been introduced whereby primary care patients are seen by primary care
8 clinicians (general practitioners and nurse practitioners) working in services within or
9 alongside emergency departments [1-4]. “Primary Care streaming” was introduced in 2017
10 as policy guidance from NHS England (with £100 million of capital funding available to
11 emergency departments in England) to help manage increasing demand on emergency
12 departments [5-9]. The recommended service design was based on a service operated at
13 Luton and Dunstable Hospital (Bedfordshire, England) whereby patients attending the
14 emergency department may be identified by emergency department nurses as having non-
15 urgent problems, have a brief initial assessment at the ‘front door’ of the emergency
16 department and are ‘streamed’ to primary care clinicians working in a co-located but
17 distinct primary care service [7]. Primary care services in the community typically consist of
18 general practitioner-led practices, pharmacy, dentist and optician services. However,
19 primary care services that are co-located with emergency departments consist of care
20 delivered by general practitioners, advanced care practitioners and primary care nurses.
21 NHS England and Improvement (pre-April 2019 known as two NHS organisations - NHS
22 England and NHS Improvement) recommends these services are in operation 8am-11pm,
23 seven days per week with a robust governance structure in place to inform streaming

24 guidance and protocols [1]. Specific safeguards should be in place to ensure the safety of
25 patients redirected off-site to another appropriate service, including the acceptance of the
26 patient by the off-site service [9, 10].

27 A range of different primary care service models in emergency departments already existed
28 before the policy implementation [1, 2]. Various methods of initial assessment have been
29 described (see Table 1), including: primary care clinicians screening and directing patients,
30 emergency department nurses streaming patients from the front door to a primary care
31 service, emergency department nurses combining streaming with a triage process [2]; and
32 patients being called for assessment and treatment by the emergency department nurses
33 ('see and treat') [11]. Other processes include patients being directed after assessment to
34 other on-site services, or redirected off-site to community primary care services [5].

35 However, variation in descriptions of the way these assessments are implemented and
36 conflated terminology causes difficulties in assessing performance, improving quality or gathering
37 evidence about safety, clinical effectiveness. Uncertainties about the evidence for costs and
38 effects of different approaches to streaming make such research vital to planning the
39 continued (or different) policy about and delivery of "primary care type services" in
40 emergency departments [1, 12].

41 **Table1. Key activities for managing patients arriving at emergency departments [1, 11]**

Triage[1] A **clinical** activity to **sort** patients by acuity so that those with the greater need are seen first.

Streaming[1] An **operational** activity to assess whether **low acuity** patients are suitable to be seen by an appropriate non-ED clinician.

Simple Assessment[11]	A brief ‘hands-off’ assessment (i.e. no formal clinical assessment) that enables patients to be flowed to a suitable treating clinician.
Complex Assessment[11]	A detailed assessment, including a clinical assessment. This may involve measurement of clinical parameters e.g. NEWS2 score, and initiation of investigations (e.g. blood or radiological tests).
See and treat[11]	The first clinician to see the patient is responsible for all diagnosis and treatment – usually used for patients presenting with minor illness or injury.
Navigation[11]	Patients are directed to an appropriate on-site service without a formal process of clinical assessment. This process is carried out by a non-clinician (receptionist) or computer kiosk, using clear criteria.
Redirection	Patients are sent to a care provider at another geographical site. This may be in the context of a formal care relationship e.g. to an Urgent Treatment Centre / GP Out-of-Hours facility/ GP Hub or Surgery or a dentist / pharmacy.

42

43 The GPs in EDs Project

44 This study is included in phase two of a larger project evaluating effectiveness, safety,
45 patient experience and system implications of different models of primary care services in
46 or alongside Emergency Departments in England and Wales.[13] In phase one we drew on
47 findings from a realist rapid review, results of a national survey and follow-up interviews

48 with clinical directors and an initial stakeholder conference (February 2018) to develop a
49 taxonomy of the form and function of primary care services in or alongside emergency
50 departments [1].

51

52 Aim of this study

53 To help our evaluation and enable consistent conceptual understanding of streaming for
54 evaluation, a clearly defined classification was needed which identifies and describes in
55 detail the emergency department streaming pathways to primary care services. Therefore,
56 we carried out a more focused study of how patients are assessed on arrival at an emergency
57 department and are streamed or redirected to on-site or off-site primary care services. In
58 this paper we aim to describe and classify the predominant types of primary care streaming
59 pathways in different models of emergency department primary care services in England
60 and Wales using additional data from directly observing streaming and a second stakeholder
61 conference.[1].

62 **Methods**

63 We used a multi-stage (and iterative) method, firstly distributing an online survey to
64 emergency departments across England & Wales, then interviewing selected clinical leads,
65 and finally, undertaking case studies of certain sampled emergency departments. Thus we
66 sought greater detail from sites illustrating specific features, and used the in-depth site visits
67 for detailed description of different types of streaming pathways.

68 **Cross-sectional survey**

69 In September 2017 we distributed an online survey (www.onlinesurveys.co.uk) (and
70 reminder) to all type 1 emergency departments(consultant-led 24-hour services with full
71 resuscitation facilities)in England (n=171)and Wales (n=13).[14] The survey was designed
72 and piloted by our study management group comprised of, academic GPs and ED clinicians
73 (doctors), and patients. We used the expertise and experience of some of our emergency
74 department clinical contacts to review the survey and support us in validating the survey
75 content. The survey topics covered a range of questions relating to primary care services
76 located in or alongside the emergency departments and included specific questions relating
77 to primary care streaming (e.g. how and what type of patient groups were selected for
78 primary care streaming; how they were streamed to primary care; and who streamed them;
79 seeAppendix1). [1]We identified whether the department had made capital funding bids for
80 streaming (data available from Department of Health) when these were available in 2017
81 and used this to assess non-response bias. We supplemented the responses with other
82 publicly available data (e.g. <https://www.Nhsbenchmarking.nhs.uk/> and
83 [https://www.healthylondon.org/ resource/londonuec-stocktake/](https://www.healthylondon.org/resource/londonuec-stocktake/)) and publicly available
84 documents (including Care Quality Commission reports, Board papers and news items
85 sourced from internet searches).

86 87 **Clinical lead interviews**

88 Using survey data, we purposively selected a sample of 30 potential study sites that
89 reflected three different models of emergency department primary care services (“inside-
90 integrated”, “inside-parallel” and “outside-onsite” – see Table 2 [1]) to invite participation in
91 a follow-up interview. It was important to capture variation in context, so we selected
92 departments that described different ways of streaming patients to primary care services

93 and departments of different sizes and locations [see Box 1 below]. Clinical leads were
94 invited by email and written informed consent was obtained before conducting interviews.

95 The aims of these interviews were to gather more in-depth descriptions of how their
96 primary care service models operated, to help with selecting a sample of study sites with
97 varying experiences of successes and challenges. Primary care streaming was one
98 component included in our semi-structured interview guides. Follow-up questions asked
99 about which members of staff carried out initial assessments, how they made streaming
100 decisions, and the services to which they streamed patients [see Appendix 2]. Interviews
101 were conducted by telephone or in-person by ME between February 2018 and March 2019
102 (average length 60 minutes). All interviews were audio-recorded and transcribed verbatim.
103 Ethical approval for the survey and follow-up interviews was given by Cardiff University
104 School of Medicine Ethics Committee (ref: 17/45).

105 **Box 1: Selection criteria for the purposive sample of Emergency Departments**

In EDs where a primary care service had been implemented in the emergency department since 2010 we selected sites to ensure we included:

- Variation in service model - delivering a separate primary care service, inside or outside the footprint of the emergency department, a primary care service integrated with the emergency medicine service or
- Spread of geographical locations in England and Wales
- Variety of contexts - including hospitals in rural and urban locations, small and large hospitals, higher vs lower attendances
- Variation in streaming method – who streams, streaming criteria and guidance
- Variation in the physical layout of the department

106

107

108 **Case study observations and interviews**

109 Part of the larger evaluation involved using the taxonomy of primary care models in or
110 alongside emergency departments to categorise emergency departments and carry out
111 more in-depth exploration of how these models functioned. We invited clinical directors of
112 13 emergency departments from our interview sample to volunteer their department for in-
113 depth 'case study' site evaluations. The sampling strategy included three or four emergency
114 departments from the three different types of primary care service models and three
115 emergency departments with no primary care service models (see Table 2). To ensure
116 maximum diversity of types and characteristics of emergency departments we also selected
117 hospitals of different sizes, different levels of attendance and different geographical
118 variations locations throughout England (there were no GP models in use in Wales).

119

120

121 **Table 2. Primary care service models**

Primary care service model	Description
Inside: integrated	A primary care service fully integrated with the emergency medicine service, where staff see both primary and emergency care patients (n=3).
Inside: parallel	A separate primary care service within the emergency department, for patients with primary care type problems (n=4).

Outside: onsite Primary care service is elsewhere on the hospital site (n=3).

122

123 We conducted visits between February 2018 and April 2019. Two researchers (ME, a
124 medical sociologist and AC, a clinical research fellow and GP) visited each case study site for
125 three days. We observed patients arriving at the reception desk and triage and streaming
126 assessments and conducted formal and short informal interviews with nurses with
127 responsibility for carrying out streaming and triage assessments and other clinicians (ED
128 doctors and primary care clinicians to ask them about how streaming worked in the ED [see
129 Appendix 3]Observations were carried out during the hours that primary care staff worked
130 in the department (generally between 8am and 10pm) and included weekdays and
131 weekends. Observations and informal interviews were recorded in field notes and formal
132 interviews were audio-recorded and transcribed verbatim. Ethical approval for case study
133 visits was given by Wales Research Ethics Committee 1 (ref: 17/WA/0328).

134 **Data analysis**

135 *Survey*

136 For this paper the survey data were analysed descriptively to summarise how many
137 departments had primary care services and the methods of streaming that were reported.

138

139 *Clinical lead interviews*

140 An initial thematic coding framework was created by ME that was partly deductive (based
141 on our earlier rapid realist review, survey responses and taxonomy of models [1, 15]) and

142 partly inductive (based on the interview data).The themes to be included in the thematic
143 framework were discussed and agreed with two other researchers (AC and FD). Interview
144 transcripts were coded in NVivo11 (QSR International, Daresbury; see appendix 4) to
145 themes/ and subthemes within this thematic framework, also allowing for new themes to
146 be identified.[16] The themes were explored to identify patterns of commonality, variations
147 and differences between and within different models of primary care streaming pathways in
148 emergency departments.[17] A proportion of the transcripts (40%) was independently
149 coded by a second author (DP). Agreement between coders was high (>90%), with only
150 minor amendments and clarifications made to the coding.

151 *Case study visits*

152 Interview transcripts and observation notes from case study visits were also coded in Vivo
153 11 to identify themes relating to primary care streaming. We triangulated themes from the
154 survey responses, interviews with clinical leads and themes from interviews and
155 observations at case study sites to produce a set of draft classifications for methods of
156 streaming. Because data were collected from multiple sources, we sometimes encountered
157 elements of conflict between these sources. To resolve this, we used a hierarchy approach
158 in which fieldwork observations (where available) were considered the most reliable,
159 followed by clinical director interviews, survey responses and other data sources, in
160 descending order of reliability [1]. These were based on: where streaming took place (at the
161 front door or inside the emergency department); who streamed patients (level of nursing or
162 other staff); to where patients were streamed (emergency department, primary care service
163 or other hospital services); and to where patients were redirected (off-site).

164

165 *Consultation with Stakeholders*

166 We held a second stakeholder conference in December 2019 which was focused on
167 describing streaming methods, exploring theories of patients' acceptability of streaming
168 and patient safety. Invited attendees included emergency department and primary care
169 clinicians, service managers, primary and emergency care academics, patient and public
170 contributors and Royal College of Emergency Medicine representatives. Attendees received
171 information packs including a diagram of the pathways to primary care to read before
172 attending the conference. At the conference, a workshop was held where attendees were
173 shown different streaming pathways and were asked to evaluate statements based on
174 patients' experiences of streaming (data presented from the case study sites). Feedback was
175 obtained verbally (flipchart summaries) and in writing on feedback forms.

176

177 *Patient and public involvement*

178 Patients and public members were involved in the study design and as co-applicants in the
179 funded study.[13] They used their experience as NHS patients to contribute to the content
180 of the questionnaire and qualitative interview guides and also advised on recruiting public
181 and patient contributors to the stakeholder conference. They were involved in discussing
182 the draft classifications in Management Group meetings, and at the Stakeholder conference
183 [18]

184 **Results**

185 **Summary of survey findings**

186 Seventy-one English and six Welsh survey responses were received (n=77/184, 42%).In
187 addition, we obtained data for 41 English departments from other sources (e.g. NHS

188 Benchmarking), including five English Type 1 departments that had not been invited to
 189 complete the survey (status can change year on year), totalling information on 62%
 190 (n=118/189) of type 1 emergency departments in England and Wales.[1, 15] Of the 71
 191 English survey responders, 82% (n= 58/71) had applied for capital funding, and of 100 non-
 192 responders in England, 84% (n=84/100) applied for capital bid funding [1, 15] Table 3
 193 summarises survey data on who streams which patients and how to primary care staff.

194 **Table 3. Summary of survey data on streaming**

Survey Question: Who streams patients to primary care staff?	Number of responses (EDs)
ED nurse	37
GP self-selects	23
ED Dr	16
Primary Care nurse	9
111 telephone triage service books appointments	9
Paramedics stream ambulance patients	6
Other	2
Which patients are streamed to a primary care staff?	Number of EDs
Primary care problems	49
Low acuity (including minor trauma)	28
Only specific groups	
Directing patients from the front door to most appropriate area or clinician within ED	11
Directing patients from the front door e.g. to ED or community	9
Undifferentiated patients (same case mix as ED clinicians)	7
Other	2

How are patients selected to be streamed to primary care staff?	Number of EDs
Using locally developed criteria	35
Using clinical judgement	35
Using a national tool (e.g. Manchester Triage System)	11
Other	3

195

196 *Numbers total more than 77 as responses not mutually exclusive*

197

198 **Qualitative findings**

199 **Selecting a sample of emergency departments that used streaming**

200 We conducted interviews with 21 emergency department clinical leads following the survey.

201 Only 11 emergency department streamed patients to a primary care service: five

202 departments streamed at the 'front door' (before patients were booked in at reception),

203 and six had nurses streaming from 'inside the department' (after patients were booked in at

204 reception).

205

206 **Case study observations and interviews**

207 Streaming was carried out in eight of 13 emergency departments in which we were

208 conducting visits for in-depth observation and interviews (hospitals 3, 4, 6, 7, 9, 10, 11 and

209 13). Of the five that did not operate streaming, three emergency departments did not have

210 a primary care service (hospitals 2, 12 and 15) and in the two other departments general

211 practitioners selected their own patients (hospitals 8 and 14).

212 We observed a range of pathways used to allocate patients to primary care clinicians (GPs
213 and nurse practitioners), emergency department clinicians (doctors, nurses), clinicians
214 (doctors, nurses) in other hospital services or redirected to community primary care
215 services. These can be summarised as follows:

216 1) **Front door streaming** (patients streamed by a nurse at the front of the emergency
217 department – before being booked in at reception),

218 2) **Streaming inside the emergency department** (patients streamed by a nurse working
219 inside the emergency department– after being booked in at reception),

220 3) **No primary care streaming** (usual triage, with GPs self-selecting patients)

221 4) **Combined streaming pathways** (combinations of 1-3 within the emergency
222 department or across the ED and primary care services, varying at different times).

223 These will now be described, including their implications for other activities such as triage
224 and re-direction. Figure 1 portrays three pathways (1-3) where patients are first seen by a
225 clinician (usually an emergency care nurse) at the front door and have a rapid assessment
226 before being streamed; or are first seen by a receptionist and booked in before being
227 streamed from a triage room inside the emergency department to the emergency
228 department areas (minors, majors, resus), to a primary care service or to other hospital
229 services (e.g. eye clinic, early pregnancy unit, GP out-of-hours service); or are redirected to
230 community primary care services. We refer to themes and subthemes from our thematic
231 framework (appendix 4) throughout this section)

232

233

234

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238

239 **Fig 1. Streaming pathways in emergency departments**

240

241 **1. Front door streaming**

242 Senior emergency department nurses typically carried out a rapid assessment (with
243 observations of vital signs if necessary) in a cubicle near the emergency department front
244 door (see theme 1.1, see appendix 4 for list of themes) and streamed patients to emergency,
245 primary care or other hospital services based on Manchester Triage scores and using
246 streaming criteria (hospitals 9, 10, 13; see Figure 2). Patients then book in at the emergency
247 department reception and are 'flowed' to be seen by emergency department clinicians or
248 primary care clinicians working in a treatment room next to the emergency department
249 (inside-parallel model) or to an urgent care reception in a separate part of the hospital with
250 a separate entrance to be seen there by a primary care clinician (outside-onsite model).

251 *"We have to have experience up front because it's an extremely important job getting them*
252 *in the right place". (Senior nurse at hospital 10)*

253 Within the ‘front door streaming’ type, some variations were identified (Figure 2). At
254 hospital 9 we observed a non-clinical ‘navigator’ who assisted with redirecting patients after
255 they were streamed, helping to book appointment slots with community primary care
256 services (theme 2.1).

257 *“So, we have a navigator who’s a clerical individual who will phone up your GP and*
258 *say can you see this patient today and they’ll say yes, tell them to come along at 4*
259 *o’clock and we send a bunch of patients away every day using that methodology”.*
260 (Clinical director, hospital 9)

261 At hospital 13 (an outside-onsite model) there were two separate front doors, two
262 reception areas, streaming from the emergency department into the emergency
263 department or to the reception area of the urgent care centre in part of the hospital 100
264 metres away from the emergency department.

265 **Fig. 2 Variations in front door streaming pathways**

266

267 *Different pathways for children*

268 At hospital 13, children were assessed and streamed at the *front door* to which adults
269 attended, but with specific criteria for children to be streamed to a children’s area of the
270 emergency department or to an urgent care centre. At hospitals 9 and 10 children were
271 streamed to be assessed by a triage nurse in a dedicated paediatric emergency care area
272 *inside the emergency department*. At hospital 10, streaming criteria were applied during the
273 triage process to stream children to the urgent care centre if appropriate. At hospital 9,
274 children could also be redirected to community primary care services (*theme 1.4*).

275

276 **2. Streaming inside the Emergency Department**

277 Combined streaming and triage assessment was carried out, usually by an emergency
278 department nurse or a paramedic, in a triage room *inside the emergency department*, after
279 patients had booked in at reception. Patients could be streamed to emergency medicine,
280 primary care or other hospital services (e.g. radiology (theme 1.2)).

281 At hospitals 4, 6 and 7, some patients were also streamed to the out-of-hours services
282 (theme 1.7). This occurred on a limited basis at certain times of the day (e.g. two patients
283 per hour after 6pm and weekends), if the emergency department primary care service was
284 understaffed, not staffed or in the process of closing. However, streaming to the out-of-
285 hours GP services was also not consistently available (e.g. where the out-of-hours GP service
286 was understaffed or unattended due to high levels of demand or GPs doing home visits,
287 respectively).

288

289 Figure 3 shows a variation in emergency departments that use streaming inside the
290 emergency department. At hospitals 4 and 6 streaming was combined with emergency
291 department triage but at hospital 7 primary care streaming was a separate process from
292 emergency department triage and the urgent care centre nurses also called some patients
293 to 'see and treat'. The approach to streaming here was described as 'complex streaming'
294 (theme 1.3), required an additional stage of 'non-clinical streaming' by receptionists at the
295 ED reception (using strict criteria) and it was adapted based on levels of demand (theme
296 1.10):

297 *“When I say streaming, because it can mean all sorts of different things, they do*
298 *‘complex streaming’, so like ‘see and treat’, and they do whatever assessment is*
299 *needed essentially, so it’s not just sign-posting”*. (Clinical Director, hospital 7)

300 **Fig.3 Variations in ‘streaming inside ‘pathways**

301

302

303

304 *Different pathways for children*

305 At hospitals 7 and 11, there were separate emergency departments for adults and children
306 and an outside-onsite urgent care/primary care service. No children were streamed from
307 the children’s emergency departments to the primary care services, and there were
308 procedures to transfer children from the urgent care/primary care service to the children’s
309 emergency department if needed (theme 1.4).

310 *“Any child that turns up in the children’s ED is seen, there’s no streaming or re-direction from*
311 *there If they turned up at the walk-in centre, and there was an ANP or GP on who could see*
312 *children, they would be seen there, and if it’s thought that they need a high level of care then*
313 *they would be moved on”*. (clinical director, hospital 11)

314 **3. No primary care streaming, usual triage**

315 In two services that we observed, primary care clinicians were integrated into an emergency
316 medicine team (‘inside-integrated’ model), the usual triage assessments were carried out
317 and primary care clinicians selected which patients they saw patients based on their

318 experience and interests (hospitals 9, 14) (themes 1.8 and 1.9). Primary care clinicians at
319 hospital 14 focussed on a specific group of emergency care patients (e.g. frail elderly
320 patients) during daytime hours and saw patients with low acuity minor illness from late
321 afternoon into the evening. Patients with ongoing primary care conditions and those
322 deemed not in need of urgent care were not redirected to community primary care services
323 due to the distance between the hospital and those services (theme 2.4)

324

325 **4. Combined methods (including streaming and GPs selecting primary care patients)**

326 We observed combined pathways to primary care in some emergency departments.

327 *Front door and further inside streaming*

328 Front door and further inside streaming were observed in some departments. At hospital 10
329 there was parallel streaming for patients arriving at the front door of both the ED and
330 Urgent Care Centre, with a streaming nurse at the front door of the ED and a primary care
331 nurse streaming from the urgent care centre (theme 1.5). Patients at hospital 13 needing
332 specialist geriatric care could also be streamed to a geriatric emergency care unit within the
333 ED (them 1.6).

334 *“we’ve actually got an emergency geriatric unit, which is now sitting in the old GP*
335 *unit, which is attached to the A&E, and the urgent care centre moved a little bit away*
336 *from the A&E. So we’ve got three streams now, rather than two”*

337 (Clinical Director at hospital 13)

338

339 At hospitals 10 and 13 the streaming nurse at the emergency department front door could
340 stream patients not suitable for emergency care to the urgent care centre where a primary
341 care triage nurse could also (re-)stream them to a primary care clinician, to other hospital
342 services such as the eye clinic or early pregnancy unit, or hand them back to the emergency
343 department (theme 2.3). The primary care nurses at hospitals 10 and 13 could also make
344 telephone calls to redirect patients with ongoing or non-urgent primary care problems into
345 booked appointments at their own GP surgery (themes 2.2 and 2.5).

346 *“They’re sent to another reception area, and they have got nurses and other things there*
347 *who screen there, there is a bit of a duplication still, and the new urgent care centre what*
348 *they do when they screen them, is either they see the GP or the practice nurses type of thing,*
349 *or they actually give them a GP appointment to go and see their own GP the next day if they*
350 *don’t think it’s urgent or anything”.*

351 (Clinical Director, hospital 13)

352

353 *Streaming inside the emergency department and primary care clinicians selecting emergency*
354 *care patients*

355 At hospital 3, streaming decisions were made *inside the emergency department* during a
356 triage assessment. A wider range of hospital services was available, to which patients could
357 be streamed within the emergency department; these included general practitioners,
358 physiotherapists, occupational therapists, older person’s nurse, chest pain nurse or
359 psychiatric nurse services. The model here was described by the clinical lead as an
360 “integrated front door model” although streaming was *inside the emergency department*.
361 However, some GPs with a special interest in emergency care conditions also self-selected

362 some patients waiting in the emergency department stream (theme 1.8). At hospital 3 non-
363 urgent primary care patients or patients with ongoing primary care problems were also not
364 redirected to community primary care services because of the distance between the
365 hospital and those services (themes 2.4 and 2.5).

366 *“There’s general practice out there, but again because of our rurality, if a patient has*
367 *spent 40 minutes to come to the ED, we didn’t think there would be a safe option to*
368 *do a quick assessment, and turn them around to an appointment which might be*
369 *hours ahead in the day and also a journey away”.* (Clinical Director, hospital 3)

370

371

372 *Streaming inside the emergency department and non-clinical streaming by reception staff in*
373 *a primary care centre.*

374 At hospital 11 in addition to *streaming inside the emergency department*, receptionists in
375 the primary care walk-in centre used proforma screening questions to make decisions on
376 where to direct patients entering the front door of the primary care centre (theme 1.10).

377 Patients were directed to the emergency department if they were deemed to need
378 emergency care or were directed to wait for the primary care clinician in the primary care
379 walk-in centre. Patients who needed primary care services not offered at the walk-in centre
380 were re-directed to their community primary care service (theme 2.1).

381

382 **Stakeholder consultations**

383 We used summarised notes from stakeholders’ feedback to help us refine the figures
384 presented above to describe the way services work and to help us clarify terminology.

385

386 **Discussion**

387 *Principal Findings*

388 Our classification (Figure 1) reflects the most common emergency department streaming
389 pathways to primary care services, usually performed by emergency care nurses: front door
390 streaming; streaming inside the emergency department (usually as part of the triage
391 process); or without streaming but primary care clinicians selecting patients. These methods
392 were used in combination in some services. Pathways were influenced by whether the
393 primary care service was 'inside' or 'outside' the emergency department and were often
394 adapted, based on local circumstances such as the department layout, patient demand
395 levels, skill mix and interests of primary care clinicians and accessibility of community
396 primary care services (Figures 2 and 3). Varied approaches to streaming were also
397 implemented for specific groups of patients (e.g. older people and children). Pathways were
398 in place to redirect patients with non-urgent primary care problems to community primary
399 care services in most services, with local variation in protocols based on staffing, patient
400 demand and links to community primary care services.

401 *Strengths and weaknesses*

402 The sampling process was based on results from a national survey, and responses from
403 emergency departments with a wide range of characteristics and contextual influences,
404 different sizes and various locations in England and Wales. The principal models of primary
405 care services in emergency departments were all represented,[1]The principal models of
406 using general practitioners in emergency departments were all represented [1], and there
407 was no evidence of non-response bias for the important aspect about whether or not the
408 department had applied for the capital funding to develop "clinical streaming" in 2017 [1].

409 From this range of departments, we could ensure maximum variation in the sample. We
410 gathered in-depth qualitative interview and observational data from a variety of staff
411 groups, ranging from clinical leads to nurses, GPs and reception staff working on the
412 streaming, triage and redirection pathways within the emergency department and primary
413 care services.

414 One limitation is the survey response rate (42%) and limited number of sites studied as part
415 of the larger study of primary care services in emergency departments,[13]GP models in
416 emergency departments [13], so there may be other service models and streaming
417 pathways which were not included in our classification. Further survey research could help
418 explore whether our classification is more widely applicable and whether there are other
419 variations implemented.

420

421 *Context of other literature*

422 Our classification builds on descriptions of primary care service models within or alongside
423 emergency departments [1, 2], We have previously classified primary care service models in
424 terms of where patients are seen by primary care clinicians, how these service models
425 function across a spectrum of integration (from more primary care to more emergency
426 medicine service, and including streaming as a construct within the spectrum of integration
427 that varies across the GP models). In this paper we have provided in-depth descriptions of
428 the range of initial assessments (clinical and non-clinical) and the ways patients are directed
429 to emergency and primary care clinicians in the ED or to other primary and secondary
430 services, on and off hospital sites. 'Front door streaming' was generally consistent with the
431 policy literature [9]. Our description of streaming '*inside the emergency department*'

432 encompasses the range of processes described by the Royal College of Emergency Medicine
433 within their definition of 'complex streaming' (see Table 1) [11]. Within our study we also
434 observed the use of 'see and treat' and non-clinical routing carried out by non-clinical
435 members of staff [11].

436

437 *Implications for policy and practice*

438 Although policy guidance was developed based on a 'front door' streaming model,[9] local
439 context may not allow for this. Our study shows most emergency departments had
440 implemented streaming pathways with greater flexibility, adapting to local contextual
441 variations (such as the availability of staff, primary care demand and case-mix, design of the
442 department, relationships with out-of-hours and in-hours primary care services and other
443 community primary care services).

444 Good practice guidance issued in 2017 recommends safeguarding measures to ensure that
445 non-urgent patients are redirected off-site to other available services appropriately and
446 safely [19]. However, more recently, redirection is not generally recommended or endorsed
447 by the NHS due to safety risks. Despite this, we saw variation in redirection pathways, from
448 patients being advised to seek access to in-hours primary care, to nurses making telephone
449 calls to check availability and book appointments in community GP practices. However,
450 using time to make safe redirection arrangements can potentially slow down the triage and
451 streaming process and negatively affect assessment time targets. Having a non-clinical
452 member of staff (a navigator at hospital 9) to assist with redirection and to help access GP
453 appointments for patients was perceived as helping to overcome such delays and ensuring
454 patients were redirected safely and efficiently. Local agreements between emergency

455 departments and general practices, with for example some GP appointments reserved for
456 patients being redirected, could support such navigation. The Covid-19 pandemic has
457 prompted efforts to better integrate clinical systems e.g. the 111 telephone and internet
458 clinical triage system and face-to-face urgent and emergency care. The ability of digital care
459 to help integrate a decentralised care model relies on high quality data, and until there is
460 consistent measurement of streaming, it will be difficult to decide how effective it is in
461 practice and which models of care are optimum.

462

463 *Further research*

464 All such developments depend on effective streaming. The classification proposed here
465 provides a basis for further research to evaluate and understand how streaming operates
466 and its effectiveness across a range of emergency and primary care service models in
467 emergency departments. Further research that takes account of the heterogeneity of
468 streaming pathways is required to examine experiences, barriers, enablers, and concerns about
469 implementation. Our classification can help inform quality improvement/performance
470 measurement as well as development of policy and practice. Key quality outcomes
471 measured against our classification could include emergency department waiting times,
472 patient flow and experience, patient safety and cost-effectiveness, about which there are
473 still considerable uncertainties [12]. Redirection processes also need to be evaluated to
474 assess the feasibility of patients accessing off-site services (especially in rural locations),
475 their safety, acceptability to patients, completion of follow-up with other services and
476 associated clinical outcomes [10, 19]. A more in-depth focus on streaming policies and their
477 outcomes for specific patient groups such as children, the elderly or those with

478 musculoskeletal or mental health problems would also be valuable. Evaluations based on
479 this classification would offer potentially transferable findings.

480

481 **Conclusion**

482 Our study has highlighted how a central government intervention with a clear stated
483 intended model has resulted in a highly heterogeneous range of models of care. We have
484 shown that pathways for directing patients between emergency care and primary care
485 services (including streaming, triage, primary care clinicians selecting their own patients and
486 redirection) vary across the different models of primary care services in emergency
487 departments. The three main pathways observed were: streaming at the front door;
488 streaming inside the emergency department; no streaming but with primary care clinicians
489 self-selecting their patients. Local clinical leads and managers need to consider which
490 pathway(s) may best suit their local context and needs. Consistency of terminology used to
491 describe pathways between emergency departments and primary care services is necessary
492 for performance measurement, quality improvement and rigorous future multi-site
493 evaluative and descriptive research.

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