

The Emergency Department needs Emergency Care

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Disclosure & Introduction



- Employer: HMC, The Netherlands
- No commercial support / No conflicts of interest
- International Advisory Board Journal International Emergency Nursing
- Scientific Advisory Committee of the European Society of Emergency Nursing EuSEN
- Projects groups Quality & Safety EuSEM
- Reviewer: IEN, PLOS ONE, EMJ, EJEM, Family Practice, TEOJ, BMJ Open, JEN, BMC, Agency Healthcare Research & Quality.
- Research grants to investigate ED crowding & centralization (ZonMw)



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Crowding



Picture: Emdocs.net

Marie, 90 y



- Found on the floor after an unwitnessed fall
- Responsiveness ↘



Marie, arriving at a crowded ED



Tonen map 'Map Westeinde'

Aangemeld

16:43	30 jr	♀	ha voor neu; ve...
16:44	57 jr	♀	via ha crd; pob

Wachtkamer SEH

16:16	14 jr	♂	via radiologie...
16:27	26 jr	♀	MDL; buikkra...
16:33	0 jr	♂	via ha kind met...
16:36	19 jr	♀	via ha met br; ve...
16:40	0 jr	♀	via ha met br kin...
16:46	44 jr	♀	via poli neuro; pl...
15:51	26 jr	♀	(niet in WK 16...
15:55	80 jr	♀	via ha met ZD...
15:46	65 jr	♂	ha met br...
16:12	28 jr	♂	na t o M...

Wachtkamer HAP

15:41	62 jr	♂	TRI
16:03	34 jr	♂	TRI

Wachtkamer LCU

Elders

Ontslagen

16:5	43 jr	♀	verd cva	Opna...
16:42	74 jr	♀	retour; malais...	Opna...
16:29	41 jr	♀	(ambu om 15...	Opna...
16:27	79 jr	♂	benauid, verwa...	Opna...
16:25	57 jr	♂	onwel	Naar...

Triage

16:13

50 jr

via ha met ZD; benauid

Kamer 1

14:49

72 jr

via ha met br; gevallen II been

Rambach, A.H.J.H. Irene van Soest

Kamer 2

14:26

67 jr

braken met sliertjes bloe...

Woerden, G. van Elise Lancee

Kamer 3

Kamer 7/kind

15:26

78 jr

via ha met br; acuut verward

Tienoven, B.J... Marloes Staaij

Kamer 8

15:36

48 jr

afhangende mondhoek re

Verhagen, M. Elise Lancee

Kamer 9

15:44

13 jr

via poli kind voor neu; h...

Bruin, M.E. de Marlies Verhoeff

Kamer 10

16:01

28 jr

via ha met br neu; pijn II bee...

Elise Lancee

Kamer 5

15:48

38 jr

alvleesklierontsteking ?

Tienoven, B.J... Irene van Soest

Kmr 6 bed 1

15:43

6 jr

gevallen; pijn re voet

Laboyrie, R. Elise Lancee

Kmr 6 bed 2

15:40

77 jr

retour gevallen; pijn...

Lourenssen, G. Elise Lancee

Nachthosp.

Nachthosp. 01

15:00

17 jr

ha met br hik; buikpijn

Hooft, M.P. v... Irene van Soest

Nachthosp. 02

14:18

50 jr

via radiologie; gezwollen...

Gebuis, E.P.A. Sylvie Haffner

Nachthosp. 03

16:00

67 jr

via ha; uitsluiten collum#

Hooft, M.P. v... Marloes Staaij

Nachthosp. 04

10:25

45 jr

ambu 16:31 gebeld via ha m...

Laboyrie, R. Elise Lancee

Glipskamer

15:55

34 jr

trauma

Woerden, G. van Irene van Soest

LCU

LCU 01

LCU 02

16:43

39 jr

hoofdpijn

Bruin, M.E. de Marlies Verhoeff

LCU 03

15:02

42 jr

insult

Bruin, M.E. de Marlies Verhoeff

LCU 04

Fam. kamer

Observ.

Observ. 01

1

6

gevallen; ruggpijn

Bezstarostj, H. Elise La

Observ. 02

Observ. 03

Observ. 04

Spreekkamer

Personeel

Artsen	Verpleegkundigen	
SEH: Geesje	81911 Kim	3293
HEE: RHE	81040 co: Rianne	81495
INT: HSI	81047 Marlies, Ferdi, Marloes	
CAR: PTR	81083 Irene, Elise	
NEU: JUL	81627	

Legenda

Dagmeldingen (0)

Laatste versivering: 20 sec. geleden

Druk op F5 om handmatig te versers

Reduced Quality of Care

- Impaired access, ambulance diversion
- Patients leaving the ED without being seen
- Increasing wait times
- Delays in diagnosis / Treatment delays
- Risk of preventable medical errors
- Higher complication rate
- Extended length of stay
- Longer hospital stays □ less inpatient capacity



References: Morley et al., ED crowding: A systematic review of causes, consequences and solutions, PLOS One, 2018; McKenna et al., ED and hospital crowding: causes, consequences, and cures, CEEM, 2019.



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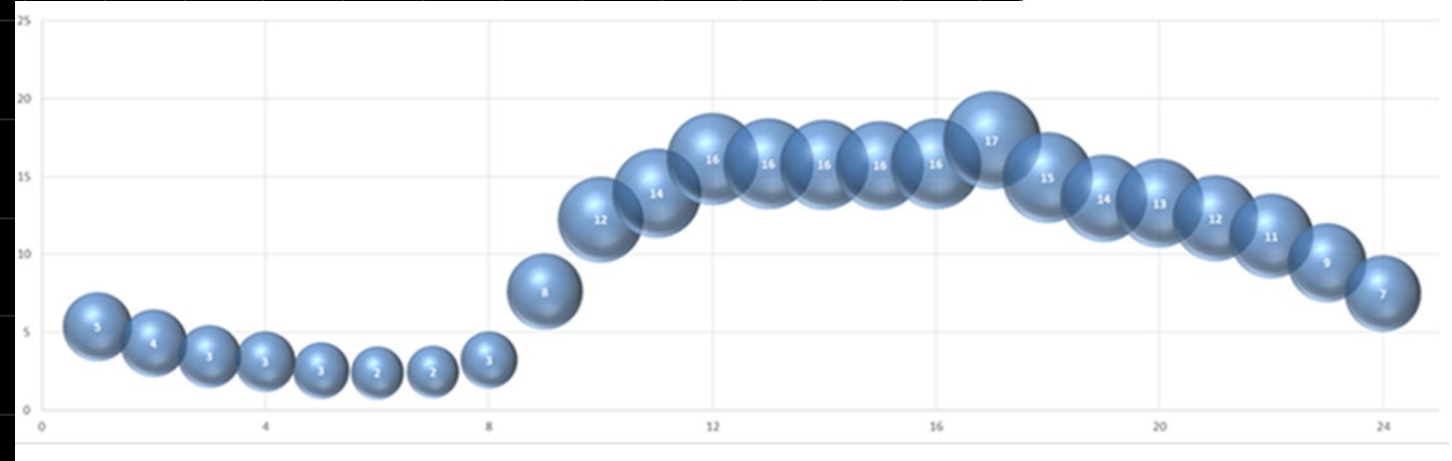
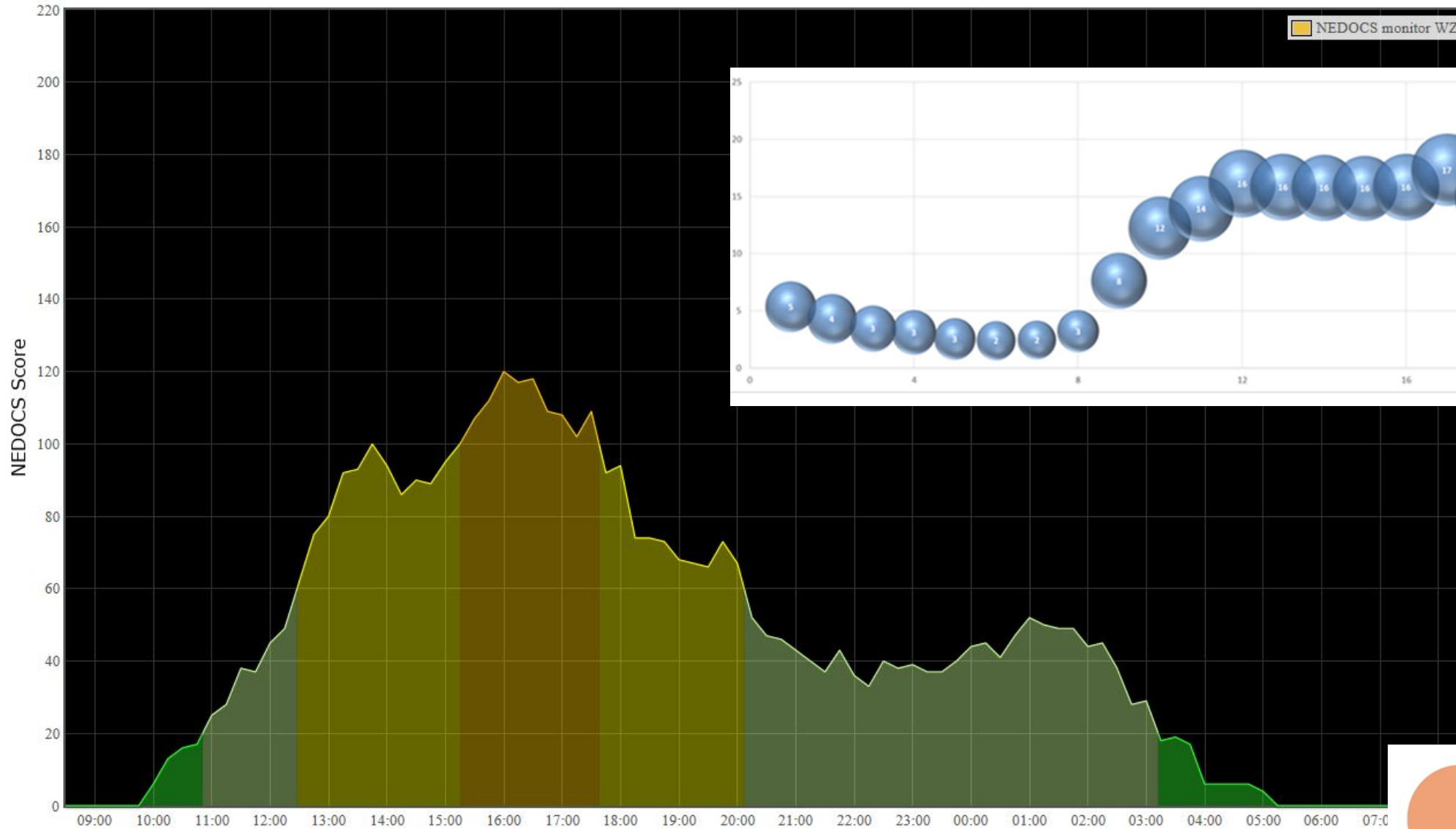
Every hour delay from stroke onset to reperfusion results in a 7.7% decreased probability of functional independence*



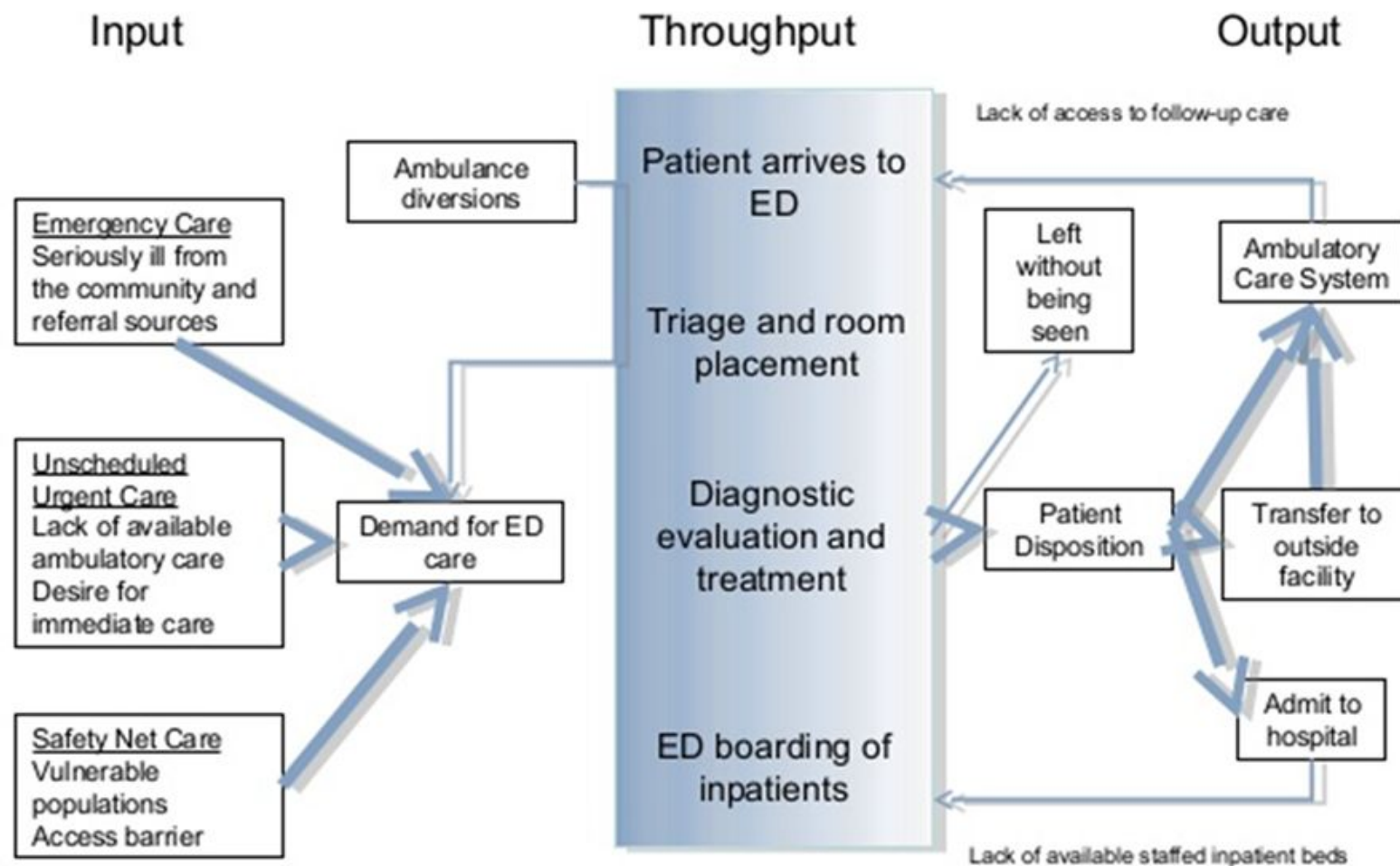
*Mulder et.al., Circulation, 2018;138:232-240



Crowding Scores & Patient Numbers



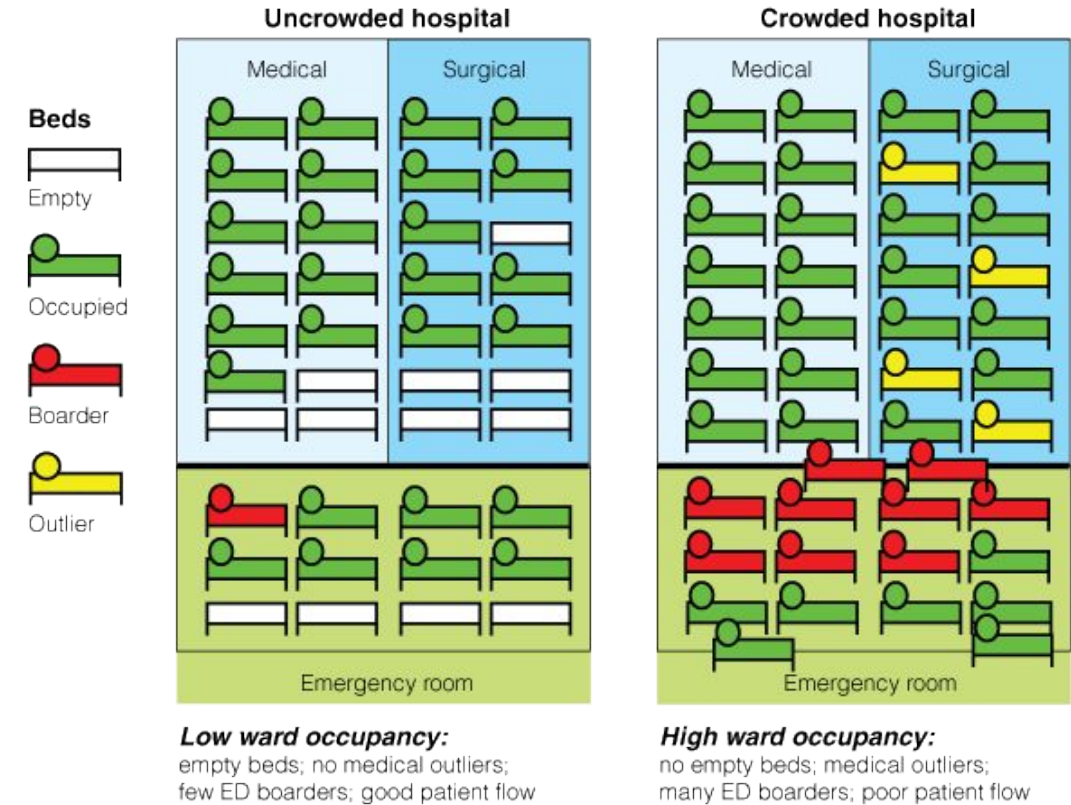
ED Flow



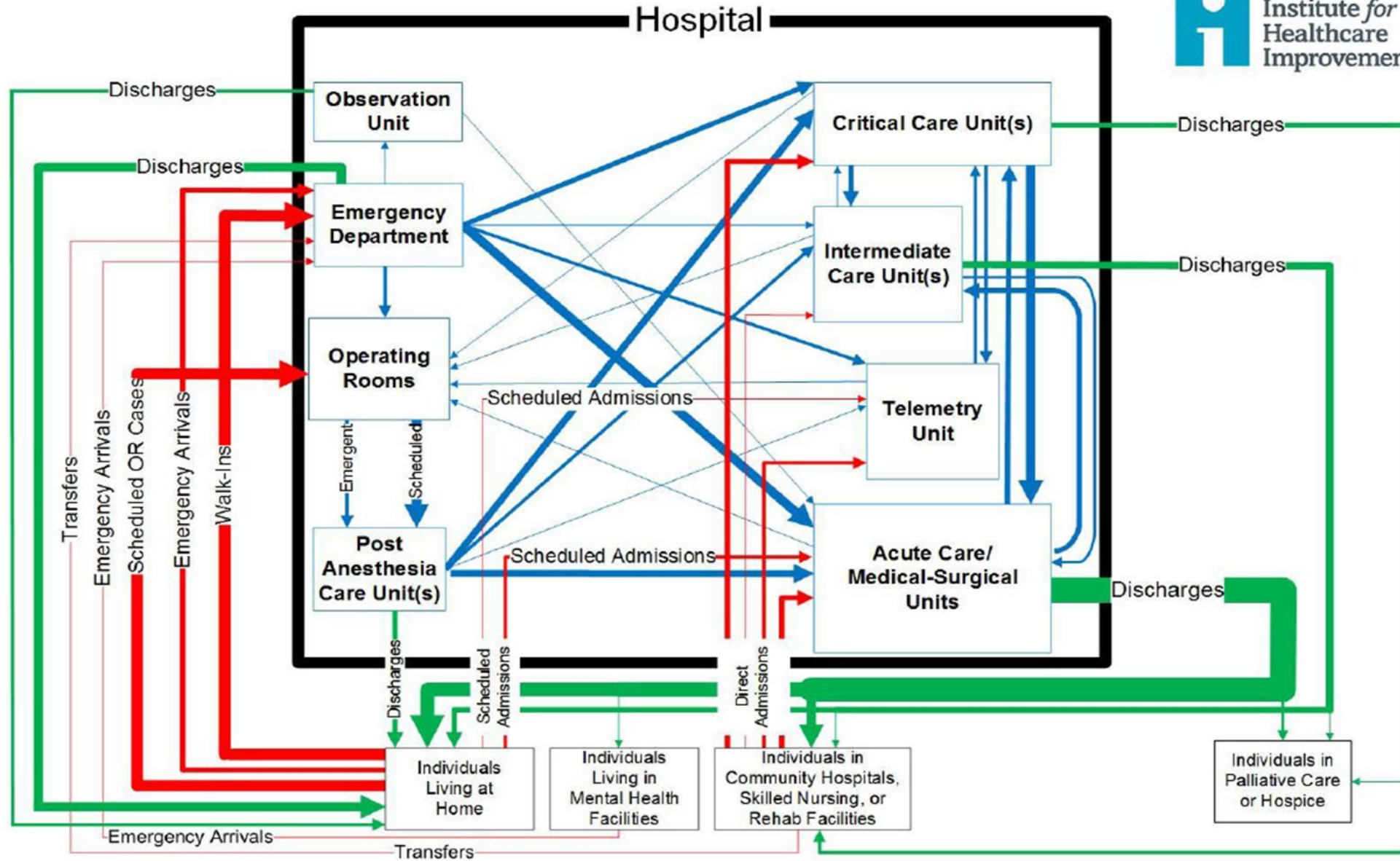
COURTESY ACEP

Figure: ACEP, IHI 2017

Boarding / Exit Block – Access Block



References: McKenna et al., ED and hospital crowding: causes, consequences, and cures, CEEM, 2019; Figure: Slideplayer.com, Spiruvilus et al., 2005.



Key: Blue arrows: Flow within hospital | Red arrows: Flow into hospital | Green arrows: Flow out of hospital | Width of arrows: Typical flow volumes

Multimodal Intervention

- A Lean radiology project
- Adding a Nurse Practitioner during day and evening shifts
- Extending the admission offices' opening hours
- Adding five attending medical specialists (a surgeon, a cardiologist, a neurologist, a radiologist and an internist) during peak hours



Aims of the Intervention

- Less crowding
- Decrease patients' length of stay
- Decrease radiology turnaround times
- Less patients leaving without being seen
- Less revits
- Shorter inpatient length of stay



□ IMPROVE PATIENT FLOW AND QUALITY OF PATIENT CARE

Picture: Arie Kievit, ANP

18 Months Pre- and Post Study

- Crowding, n=43978 / peak hours n=14670
- Patient visits, n=64012 / peak hours n=21552
- Radiology reports, n=40769 / peak hours n=30310
- LWBS
- Revisits
- Inpatient length of stay

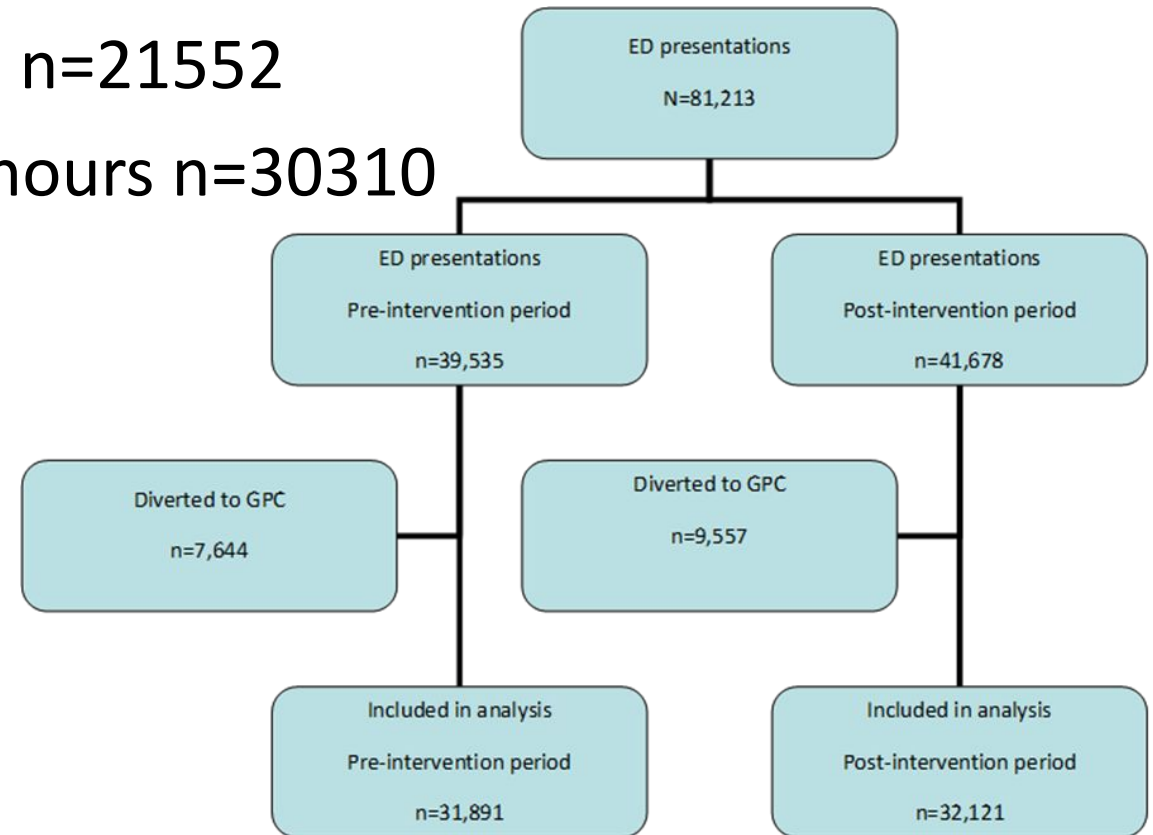


Figure: HMC, Study Flow Chart.

Patient Experiences



- Satisfaction scores 8 and 8
- Net Promoter Score increased from -15 to +20

	Control week (n = 103) [n (%)]	Pilot week 5 (n = 65) [n (%)]
Long waiting time to physicians' contact	30 (29)	13 (20)
Short waiting time to physicians' contact	34 (33)	30 (46)
First contact with physician rated as good	64 (62)	47 (72)
Waiting times need to be improved	41 (40)	12 (19)
Facilities need to be improved ^a	13 (13)	–
Communication and information need to be improved ^b	–	3 (5)
Satisfaction score [median (range)] ^c	8 (1–10)	8 (0–10)
Recommendation score [median (range)] ^d	7 (1–10)	8 (4–10)
Net promoter score ^e	–15	+20

^aFacilities: better chairs in the waiting room, food, and drinks.

^bInformation on discharge instructions

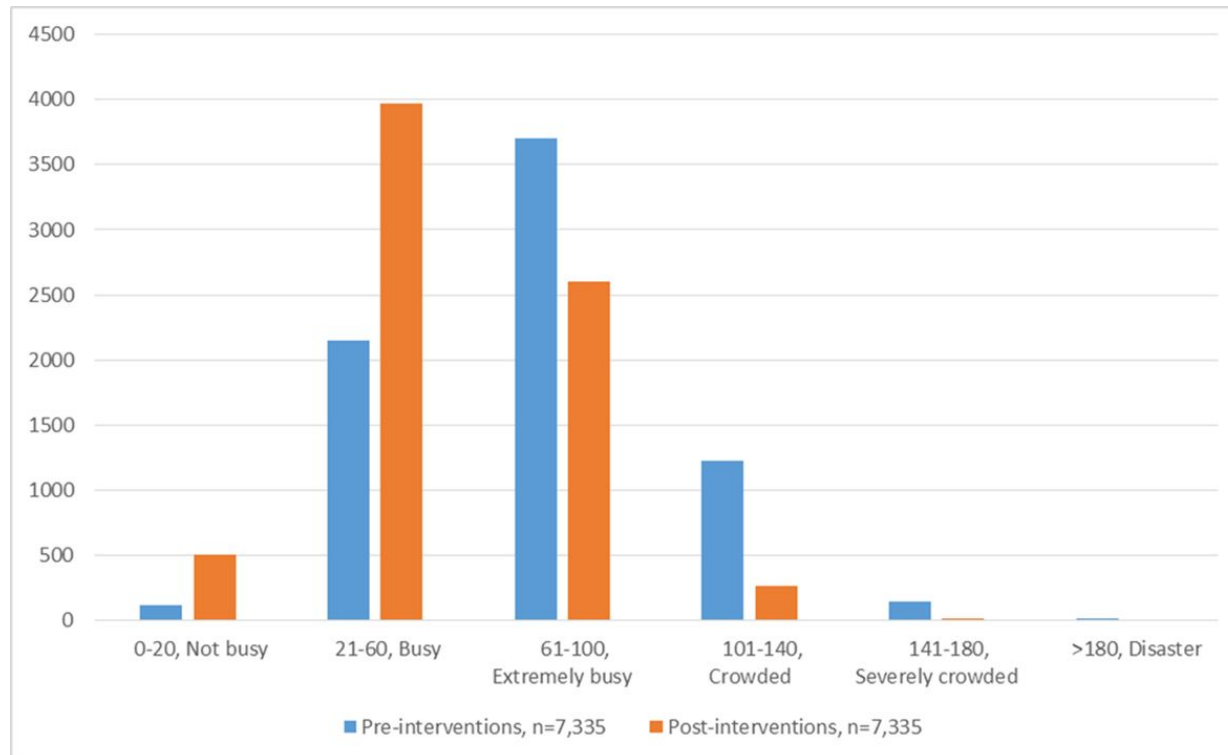
^c10-point Likert scale: 0 (not satisfied at all) to 10 (very satisfied).

^d10-point Likert scale: 0 (not likely at all) to 10 (very likely).

^eNet promoter score: the difference between percentage promoters (individuals who scored 9 and 10) and percentage detractors (individuals who scored 0–6).

Crowding

- 14670 measurements
- Median NEDOCS: 74 ☐ 54
- NEDOCS >100: 18.6% ☐ 3.5%



Results, Radiology Turnaround Times

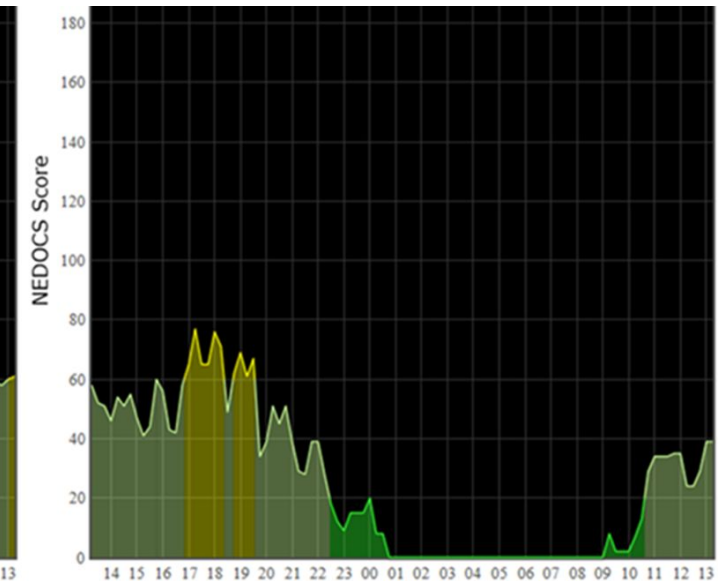
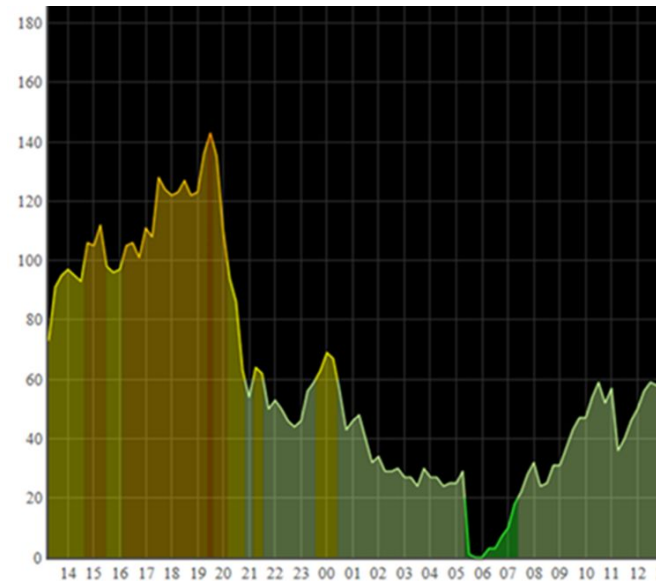
	Pre-intervention period, 10,564 orders in 8,070 presentations	Post-intervention period, 10,990 orders in 7,957 presentations	P-value
Median TAT radiology minutes (IQR)	71 (40-129)	38 (25-61)	<0.001
Median TAT per category minutes (IQR)			
Plain radiograph	55 (32-96)	30 (21-45)	<0.001
CT	94 (54-175)	56 (37-85)	<0.001
Ultrasonography	109 (70-170)	37 (25-56)	<0.001

Results, Length Of Stay

	Pre-intervention period n=15,115	Post-intervention period n=15,195	P-value
Median LOS in minutes (IQR)	167 (113-236)	154 (100-220)	<0.001
Median LOS per specialism in minutes (IQR)			
Cardiology	166 (129-218)	158 (122-214)	<0.001
Internal Medicine	206 (151-282)	206 (149-274)	0.233
Neurology	203 (143-276)	178 (123-248)	<0.001
Surgery	141 (93-208)	124 (79-183)	<0.001
Other specialism	160 (100-229)	147 (91-213)	<0.001
Median LOS for self-referred patients	142 (94-203)	130 (84-191)	<0.001
Median LOS for admitted patients	212 (155-287)	204 (147-271)	<0.001
Median LOS for patients who had at least one radiology order	194 (138-266)	180 (126-248)	<0.001

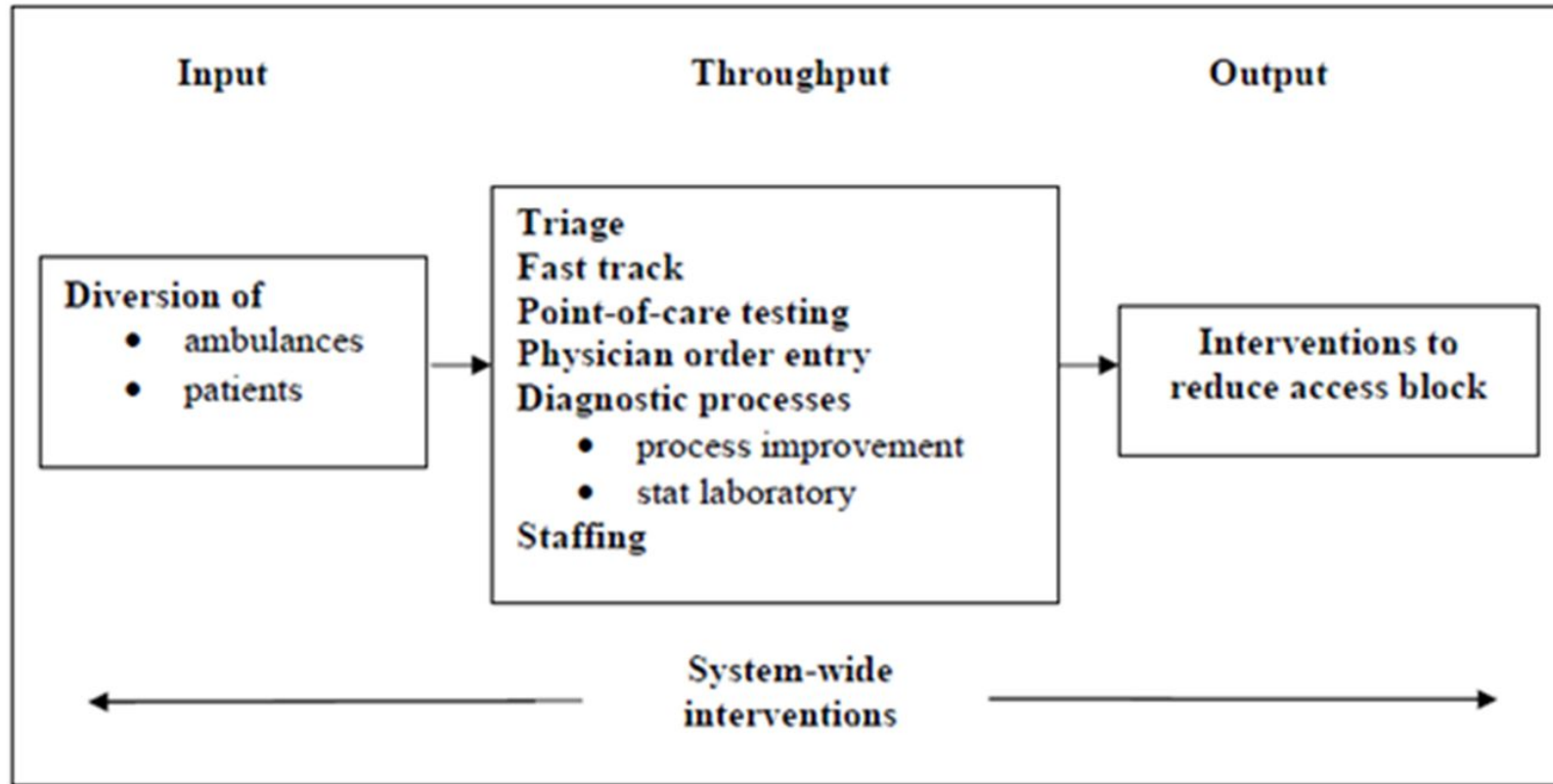
Results, Overall Effects

- LOS ↓ 8 min per patient, 13 min per patient during peak hours
- With 100-120 pts: 15-16 hours per day
- Annually 5743 hours



Conclusions: In this hospital, a multimodal intervention successfully reduces crowding, radiology turnaround times, patients' LOS, number of patients LWBS and the number of unscheduled return visits, suggesting improved ED processes. Further research is required on total costs of care and long-term effects.

Change since Marie arrived at our ED



Increased resources

&

Demand
management

F



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What about Marie?



Arrival on a crowded emergency department ☐ delayed door-to-physician time, no intervention room available.

Transfer to another hospital ☐ Delayed treatment time

☐ Chances to a disability-free life ↓

☐ Increased risk of death

Marie, 94 y



ORIGINAL RESEARCH

Open Access

The impact of a multimodal intervention on emergency department crowding and patient flow



M. C. (Christien) van der Linden¹ , H. M. E. (Jet) van Ufford², Project Group Medical Specialists³ and N. (Naomi) van der Linden^{4*}

Reminder of important clinical lesson

Case report

Night-time confusion in an elderly woman post-stroke

M Christien van der Linden ,¹ Ido R van den Wijngaard,² Shanna van der Linden,³ Naomi van der Linden⁴

BMJ Case Rep



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