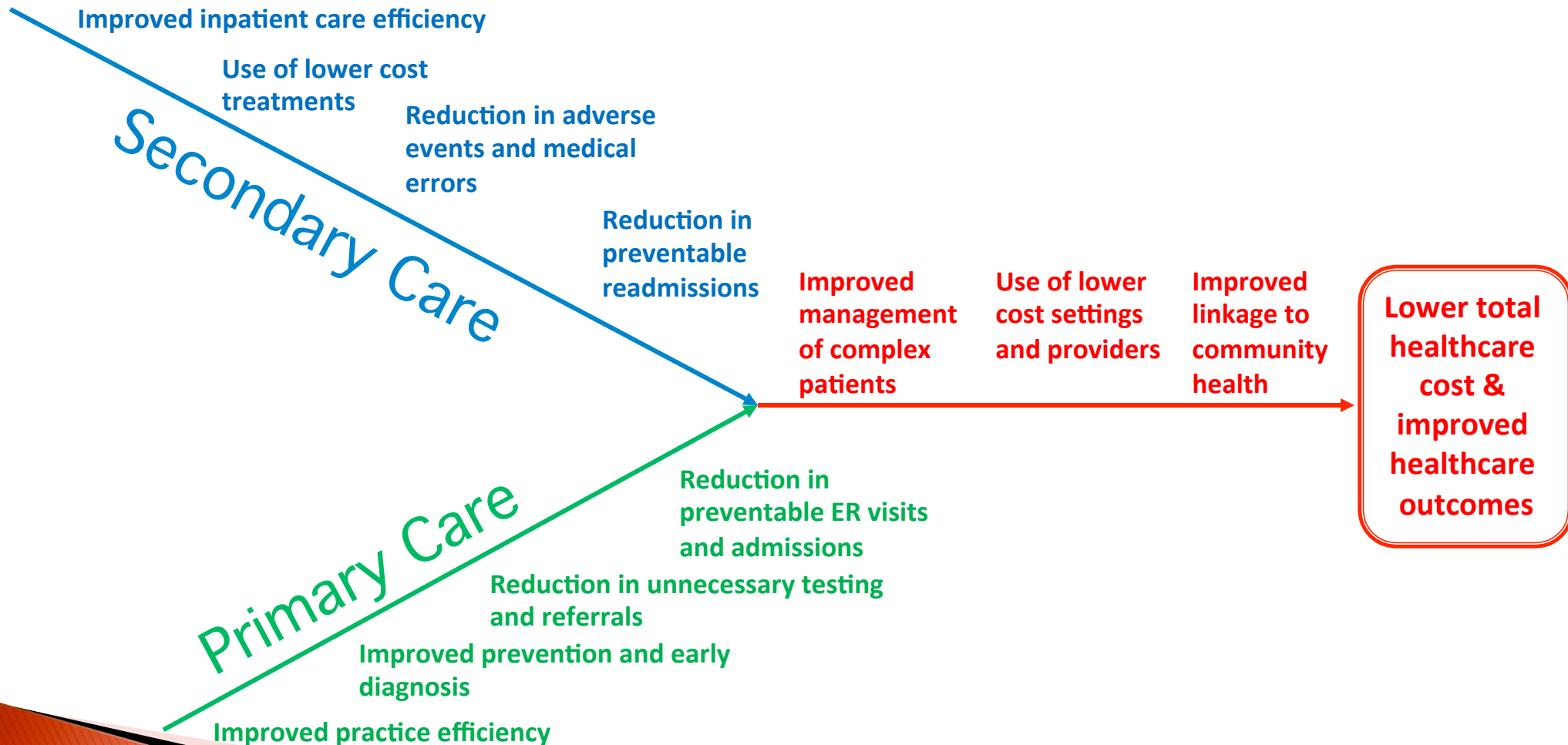# What Point-of-Care Tests Do Doctors Want?

Jeremy Howick, Caroline Jones, Christopher P Price, Annette Plüddemann,

Carl Heneghan, Ann Van den Bruel, Matthew Thompson

Department of Primary Care Health Sciences

Context: Transforming the Delivery of Health and Social Care

- Preventing illness and tackling risk factors

- Supporting people to live in their own homes

- Providing high standards of primary care

- Effective use of community health and related social care

- Acute hospital and care home use only when care not possible in other settings

- Integrating care around needs of patients and populations

The Drivers of Change in Healthcare
a US purchasers perspective

Improved inpatient care efficiency

Use of lower cost treatments

Reduction in adverse events and medical errors

Reduction in preventable readmissions

Secondary Care

Primary Care

Improved management of complex patients

Use of lower cost settings and providers

Improved linkage to community health

Lower total healthcare cost & improved healthcare outcomes

Reduction in preventable ER visits and admissions

Reduction in unnecessary testing and referrals

Improved prevention and early diagnosis
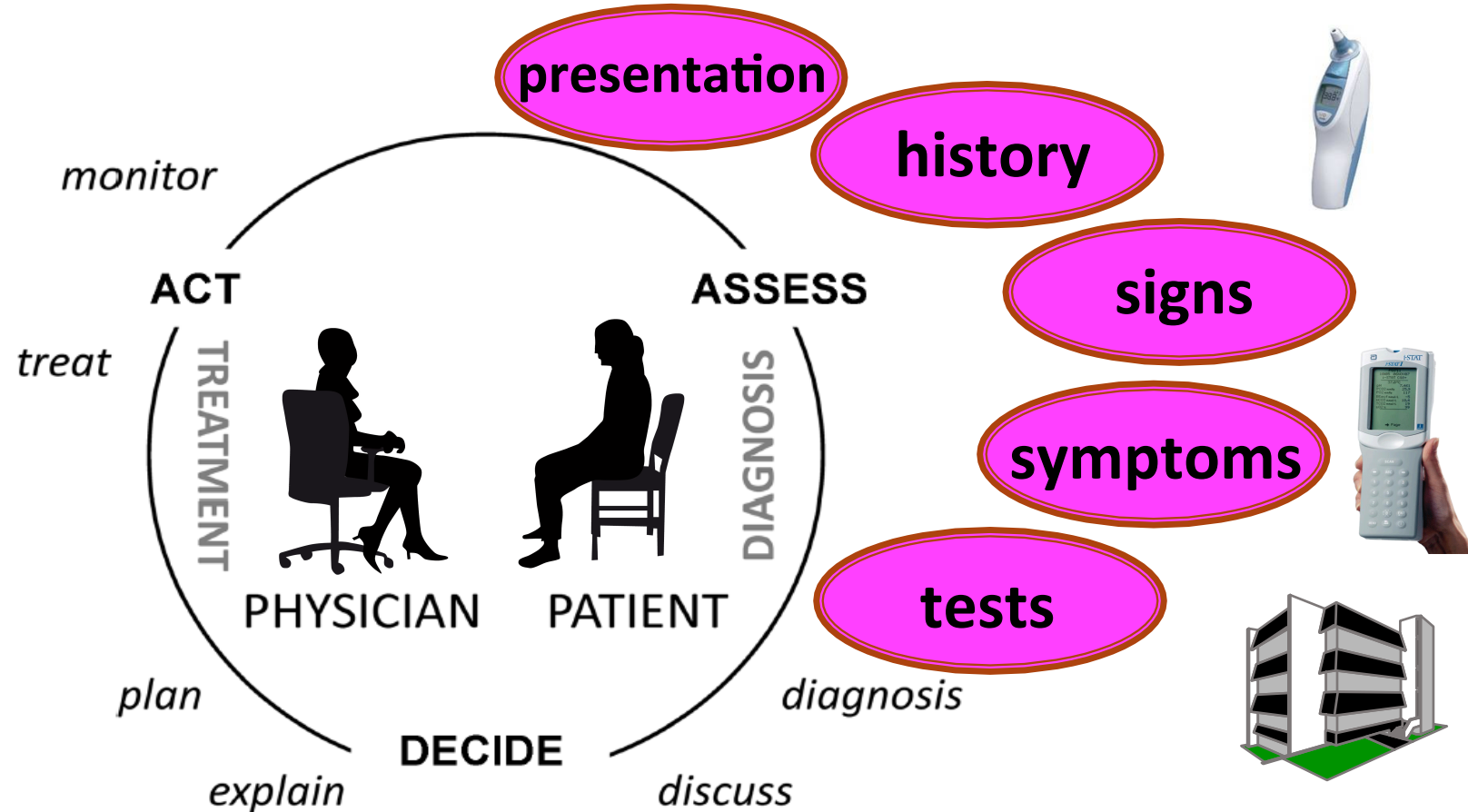
Improved practice efficiency

Shortell et al 2010

Themes of NHS Improvement Programmes 2013

- prevention, early identification and care coordination.
- creating individual care plans
- community based care models
- coordinated local health system
- improving local people's experience of services through the effective use of technology
- needs and wants of local people, and disbanding organisational boundaries that get in the way
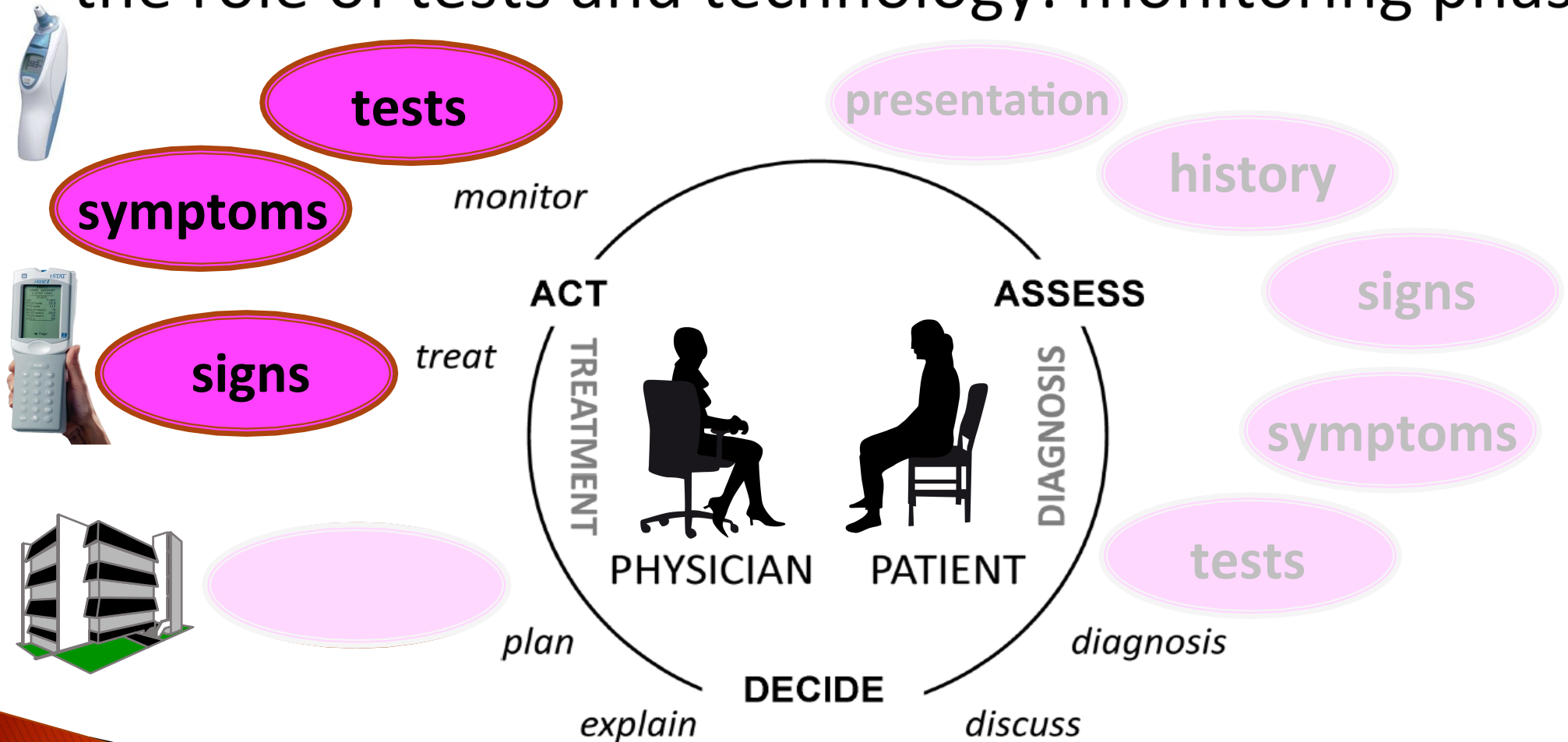- focus on reducing hospital admissions.

The Physician-Patient Dialogue
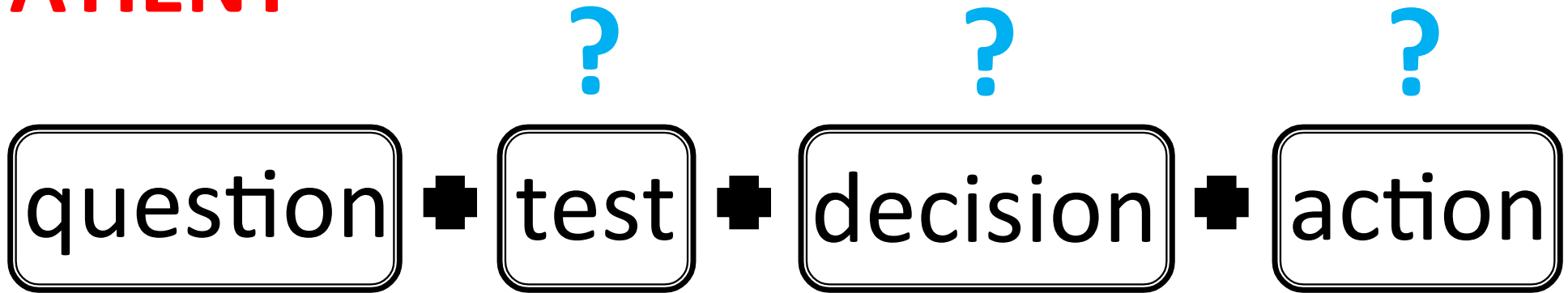## the role of tests and technology: diagnostic phase

presentation

history

signs

symptoms

tests

monitor

ACT

treat

ASSESS

TREATMENT

DIAGNOSIS

PHYSICIAN

PATIENT

plan

diagnosis

DECIDE

explain

discuss

The Physician-Patient Dialogue
the role of tests and technology: monitoring phase

tests

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Diagnostic Services
why do doctors order tests?
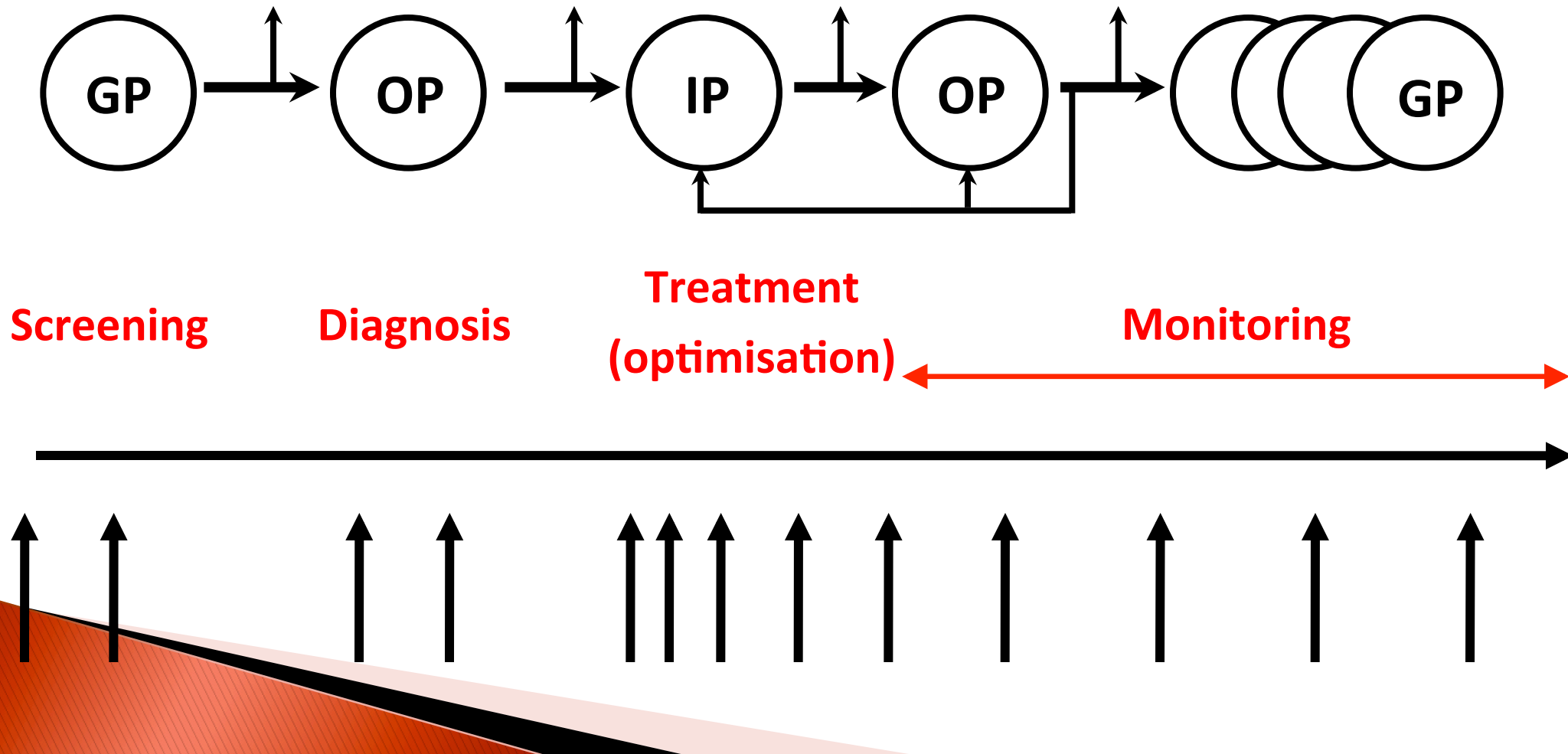
PATIENT

question ➕ test ➕ decision ➕ action

OUTCOME

Diagnostic Services
informing decisions across the care pathway

Laboratory Tests Family Physicians Would Use in their offices, if cost effective

Chemistries
HbA1c***
INR***
Microalbumin***
Lipid profiles***
BNP
Troponin CK-MB
D-dimer
Drug screen
Uric acid
Electrolytes
Glucose
Haemoglobin/HCT

Creatinine
AST
Hepatic profile
Amylase Lipase ESR
CBC
TSH
Lead
Bilirubin
Vit B12
Fructosamine
hs-CRP
ßHCG quantitative
PSA

Infectious diseases
Bacterial vs viral***
Influenza***
Mononucleosis***
Urine culture
HIV
RSV
Clostridium Difficile
Rotovirus
Bacterial vaginosis
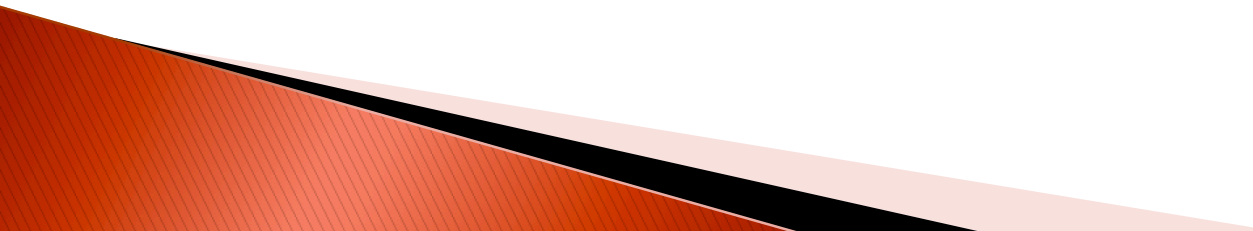Trichomonas
Helicobacter Pylori
Chlamydia
Gonorrhea
Herpes ………………

*** = very popular

Price and Kricka 2012

Research Methodology
development of a questionnaire

- Systematic review of qualitative studies

- Data about common POCT devices, inc. horizon scanning

- Discussion with content experts

- Piloted with 30 GPs

- Delivered through Doctors.net

Point-of-Care Testing
an example of the style of question

Please name up to 5 conditions for which a POCT could help you make a **DIAGNOSIS**. Please list the conditions irrespective of whether or not POCTs currently exist

a) ……………………………………………. (please specify)
b) ……………………………………………. (please specify)
c) ……………………………………………. (please specify)
d) ……………………………………………. (please specify)
e) ……………………………………………. (please specify)

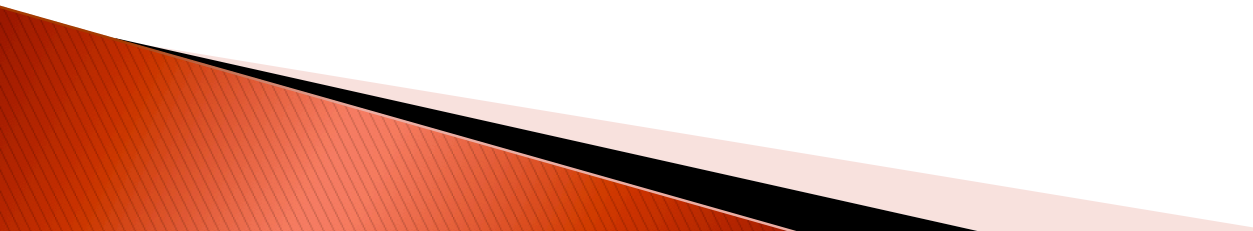- I do not believe that POCTs would help me make a diagnosis.

Open End. Must select "Open End …. a)" or "I do not believe….."; Open Ends b) to e) are non-mandatory

Point-of-Care Testing
what do primary care clinicians want?

- What POCT for diagnosis?

- What POCT to reduce referrals?

- What POCT to reduce urgent referrals?

- What POCT to manage long term conditions?

- What POCTs are currently used?

Response Rates

- Sent to 1635 regionally representative GPs in the UK.

- 1109 complete response (68%)

- Highest ever completion rate for Doctors.net!

Point-of-Care Testing
could help me make a diagnosis

Condition	ICPC code	No.	%
Urinary tract infection	U70/U71	521	46.5
Pulmonary embolism / DVT	K93/K94	478	43
Diabetes NOS	T89/T90.5	385	34.5
Acute Cardiac Disease	K74/K75/K76	282	25.5
INR / anticoagulation	XX00	199	18
Pregnancy	XX08	178	16
Anaemia	B78/B80/B81/B82	162	14.5
Heart failure	K77	124	11
COPD/Asthma	R95/R96	116	10.5

Point-of-Care Testing
international: could help me make a diagnosis

Table 2 Conditions for which respondents would like a point-of-care test to help them diagnose conditions: top 10 in each country

Australia (n=298)		Belgium (n=319)		The Netherlands (n=639)		UK (n=1109)		USA (n=405)	
Condition	Per cent (n)	Condition	Per cent (n)	Condition	Per cent (n)	Condition	Per cent (n)	Condition	Per cent (n)
Diabetes	57 (170)	PE/DVT	94 (300)	PE/DVT	106.5 (651)*	UTI	47 (521)	UTI	56 (225)
Acute cardiac disease	42 (126)	Acute cardiac disease	76 (241)	Acute cardiac disease	62.7 (383)	PE/DVT	43 (478)	Strep throat	54 (218)
UTI	32 (95)	Heart failure	24 (75)	Chest infection/ cough/LRTI	54.7 (334)	Diabetes	35 (385)	Diabetes	42 (169)
Pregnancy	26 (79)	Chest infection/ cough/LRTI	24 (75)	UTI	26.0 (159)	Acute cardiac disease	25 (282)	Influenza	40 (162)
Anaemia	18 (53)	Infections	23 (74)	Heart failure	22.9 (140)	INR/anticoagulation	18 (199)	Pregnancy	25 (103)
Chronic and acute renal conditions (excluding UTI)	15 (45)	UTI	19 (61)	Anaemia	20.0 (122)	Pregnancy	16 (178)	Infectious mono	14 (56)
INR/anticoagulation	17 (51)	Acute and chronic renal impairment	12 (39)	Diabetes	14.7 (90)	Anaemia	15 (162)	Anaemia	13 (52)
PE/DVT	13 (40)	Diabetes	12 (37)	Infections	13.1 (80)	Heart failure	11 (124)	STDs	7 (27)
Heart failure	12 (37)	Anaemia	8 (24)	Appendicitis	10.8 (66)	COPD/asthma	10 (116)	INR	7 (27)
COPD/asthma	12 (35)	STDs	7 (21)	STDs	9.0 (55)	Chest infection/ cough/LRTI	9 (102)	Acute cardiac disease	6 (23)

*>100% Since we combined PE and DVT. This is because some respondents in the Netherlands listed *both* PE and PE/DVT. In other countries we faced similar problems. Since it was impossible to split PE from DVT when respondents listed PE/DVT as a single condition, we lumped them together.
COPD, chronic obstructive pulmonary disease; DVT, deep vein thrombosis; INR, international normalised ratio; LRTI, lower respiratory tract infection; PE, pulmonary embolism; STD, sexually transmitted disease; UTI, urinary tract infection.

Howick et al 2014

Point-of-Care Testing
could help me monitor/manage a condition

Condition	No.	%
INR / anticoagulation	544	48.5
Diabetes NOS	527	47
COPD/Asthma	223	20
Acute and Chronic Renal Impairment	213	19
Lipid disorder	154	14
Hyper/hypothyroidism	124	11
Anaemia	119	10.5
Infection of bone/joint	113	10
Pulmonary embolism / DVT	104	9.5

Point-of-Care Testing
could help me reduce referrals

Condition	ICPC code	No.	%
Pulmonary embolism / DVT	K93/K94	516	46
Acute Cardiac Disease	K74/K75/K76	268	24
Diabetes NOS	T89/T90.5	133	12
COPD/Asthma	R95/R96	121	11
Heart failure	K77	116	10.5
INR / anticoagulation	XX00	99	9
Urinary tract infection	U70/U71	74	6.5
Cancer	XX07	68	6
Acute and Chronic Renal Impairment	U28/U99	61	5.5

Please Select the Answer that Best Matches your Views current or potential use of POCT (>50%)

Test	I would use (%)
D-dimer	73
Haemoglobin	72
Troponin	69
BNP	66
Chlamydia	65
CRP	61
Potassium (NB sodium 51%)	61
HbA1c	61
White cell count	60
ESR	58
Gonorrhoea	58
Nose/throat swab for influenza	55
Creatinine	53
Throat swab for Group A Streptococci	53
TSH	53
Quantitative Beta HCG	53
Platelet count	51
Uric Acid	50

Point-of-Care Testing
respondent characteristics

Characteristic	UK (survey)	UK (GMC)
Respondent characteristics		
Female	475 (43%)	48%
What year did you qualify as a doctor (median)	1996	1997
How many hours per week do you work (on average)?	39	
Percentage GP partner/Principal	711 (64%)	
Practice characteristics		
Rural	103 (9%)	
Semi-rural	274 (25%)	
Suburban	293 (26%)	
Urban	439 (40%)	
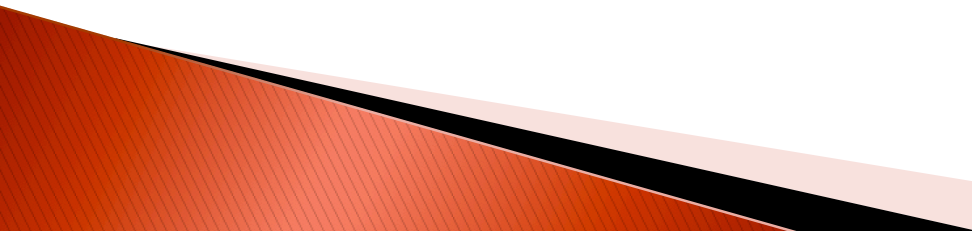
Point-of-Care Testing
practice characteristics

Characteristic	UK (survey)
Distance to nearest hospital (average miles)	7
How long does it take to get a routine blood test, such as full blood count (average days)	1.2

What next?

What Next?

- Get patient input (focus groups, survey)

- Conduct preliminary cost-benefit analysis

- Prioritize which POCT are most demanded and most likely to improve patient care

- (If necessary) develop POCTs

- Measure health impact of POCT in the setting of a controlled trial

Point-of-Care Testing
different settings: other types of questions

- Strategic planning

- Commissioning intentions

- Reducing risk

- New markets

- Quality improvement

- Patient expectations

Thank you!