

# Strategies for Sustainable Maintenance

## Addressing Backlog Maintenance and Critical Infrastructure Risk in UK's NHS Assets

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## Authors introduction sheet

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## Aim of the presentation

Reflect on the findings of a research funded by NHS Improvement (NHSI), as part of the most recent UK national policies and actions to improve safety, efficiency and operational productivity of hospital estates.

Identify potential causes of CIR and main barriers to its reduction, and present strategies for BM of built assets.

# Outline of the presentation

1. Aim
2. Context
3. Challenges
4. Delivery Plan and Methodology
5. Findings
6. Discussion
7. Conclusions and Recommendations





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The Telegraph

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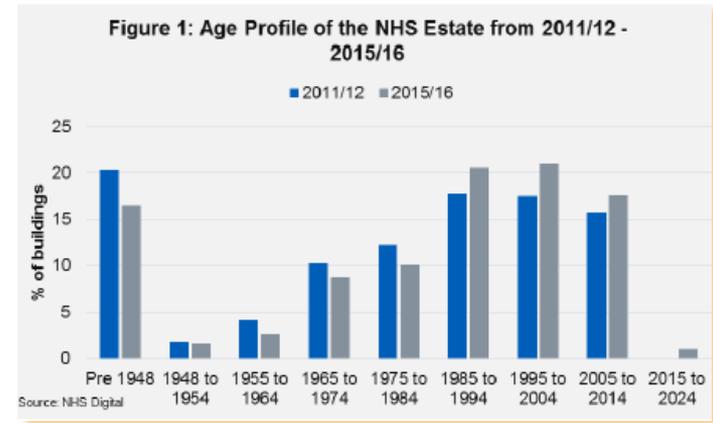


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**Let's put the news in context!**

## Context: NHS England built estate

- >1,500 sites with ~ 16,000 buildings across England
- Property, plant and equipment value of ~ £64bn
- 63% of value accounts for buildings
- 15% of value for plant and equipment
  
- 14% buildings pre-dates 1948
- Average age of estate is 25 years
- 10% of CQC inspected trusts rated inadequate
- 63% of them rated in need of improvement







## Context: 2012-13 BM and CIR review

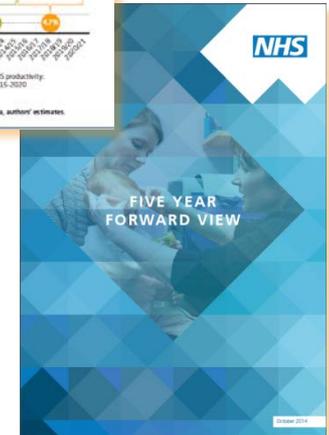
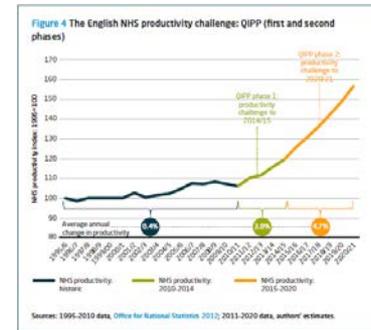
The research conducted on behalf of DH led to a proposal to the SofS to invest an additional £500m of capital in the NHS specifically to reduce CIR.

- Mills, Deka, Price, Rich-Mahadkar, Pantartzis, and Sellars (2015) *'Critical infrastructure risk in NHS England: predicting the impact of building portfolio age'*, International Journal of Strategic Property Management, 19(2).
- Pantartzis, Deka, Tann, Mills, Mahadkar, and Price (2016) *'Sustainable management of NHS assets backlog maintenance'*, Built Environment Project and Asset Management, 6 (5).



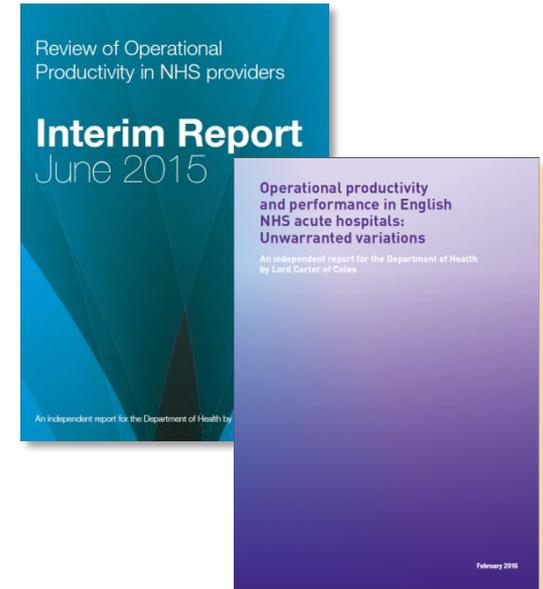
# Context: Nicholson review and 2014 NHS 5YFV

- In 2010 the “*Nicholson Challenge*” called for £20bn efficiency savings by the year 2014, with the NHS deriving more value from its budget, in order to meet rising demand and improve the quality of services without increase in funding.
- 2014 NHS *Five Year Forward View* (5YFV) identified the need to capitalise on diverse solutions and local leadership to sustainably implement: patient safety, clinical effectiveness and patient experience.



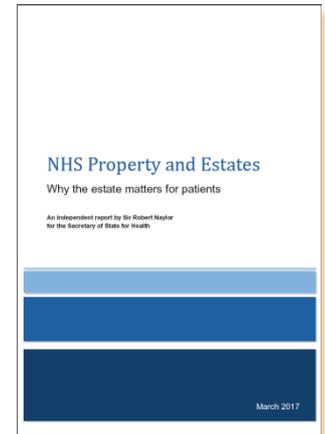
# Context: Francis, Keogh and Lord Carter reports

- In 2013, the *Francis Report* and the *Keogh Review* provided evidence of quality and safety issues still being a challenge in the infrastructures, calling for better use of technologies to improve care delivery.
- In 2016 the *Lord Carter report* estimated £5bn unwarranted variation in terms of efficiency opportunity and made 15 recommendations including the development of an efficiency metric for NHS providers, and a NHS Model Hospital data set. (\*)



## Context: 2017 Naylor's report

Sir Robert Naylor's independent report *NHS Property and Estates: Why the estate matters for patients* examined how the NHS can make the best use of its estate towards the target of releasing: £2bn of assets for reinvestment and land for 26,000 new homes. It also made 17 recommendations under three categories: improve capability and capacity; encourage and incentivise action at a local level (STPs); and develop a robust and sustainable investment strategy to enable the estate support transformation.





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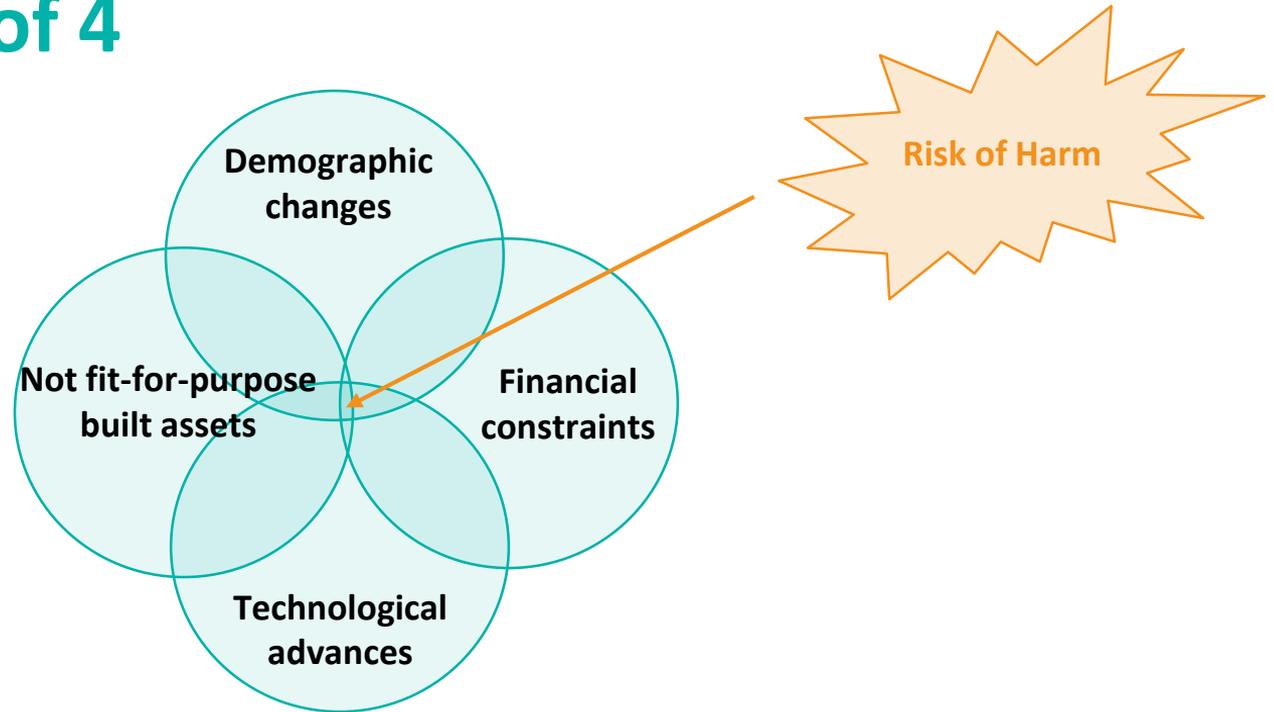
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**Challenges...any in common?**



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# Challenges - 1 of 4



## Challenges - 2 of 4

*"The environment is just not going to be fit-for-purpose and we are going to be continually patching, repairing, refurbishing. And as soon as we have dealt with part of an area, or by the time we have picked everything up, we are just going to be around that cycle again."*



*"These repairs and refurbishments are needed to ensure the health care offered to local patients is delivered in a high quality and safe environment."*



# Challenges - 3 of 4

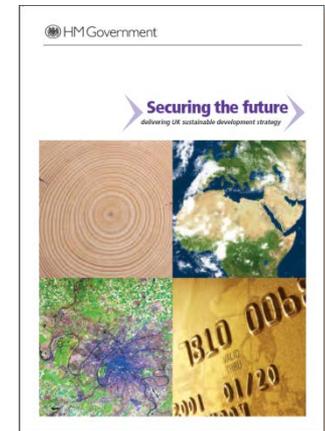
## ... Opportunities

to deliver safety, efficiency and operational productivity in hospital estates



## Challenges - 4 of 4

- The UK in 2005 announced a long-term agenda *Securing the future* to deliver a sustainable development strategy, including advice on possibilities for sustainable refurbishment of health and social care buildings.
- In 2016 the NHS and local councils came together in *Sustainability and Transformation Partnerships (STPs)* to improve NHS services and population health in every part of England, with the recognition that different STPs are at different levels of maturity in developing their STP estate plans.





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**Before progressing let's define BM and CIR!**



## Definitions: Backlog Maintenance (BM)

“It is the cost to bring estate assets that are below condition B in terms of their physical condition and/or compliance with mandatory fire safety requirements and statutory safety legislation up to condition B.”

Figure 1.1 Backlog management flowchart

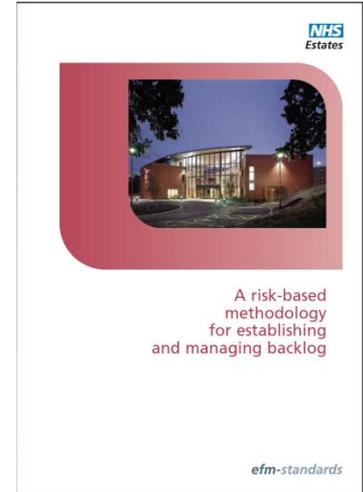


TABLE 3.2 RANKINGS FOR COMPLIANCE WITH MANDATORY FIRE SAFETY REQUIREMENTS AND STATUTORY SAFETY LEGISLATION

Each sub-element should be ranked according to compliance with mandatory fire safety requirements (including "Firecode") and statutory safety legislation as follows:

|              |   |
|--------------|---|
| <b>A</b>     | <b>complies fully with current mandatory fire safety requirements and statutory safety legislation</b>  |
| <b>B</b>     | <b>complies with all necessary mandatory fire safety requirements and statutory safety legislation with minor deviations of a non-serious nature*</b>   |
| <b>B(C)†</b> | <b>currently as B but will fall below B within five years as a consequence of unabated deterioration or knowledge of impending mandatory fire safety requirements or statutory safety legislation</b> |
| <b>C</b>     | <b>contravention of one or more mandatory fire safety requirements and statutory safety legislation, which falls short of B</b>   |
| <b>D</b>     | <b>dangerously below conditions A and B</b>   |

\* Minor deviation of a non-serious nature means a small breach in mandatory fire safety requirements or statutory safety legislation that is currently not of concern to the enforcement bodies and will be rectified through normal revenue expenditure. The minor breach will also present only a very insignificant impact on safety.  
† Sub-elements classified as B(C) should not be considered as backlog until such time as the condition of the sub-element has fallen to below condition B. Such sub-elements would be expected to be sustained in condition B by ensuring the required investment is made in sufficient time to prevent the sub-element falling below condition B.



# Definitions: Critical Infrastructure Risk (CIR)

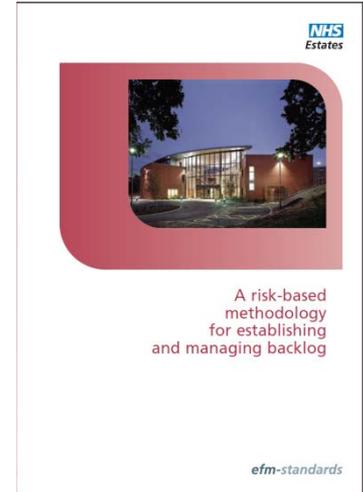
“It is a risk-adjusted maintenance cost apportioned to an asset portfolio, building, block, element or sub-element that is classed as having a backlog score that presents a high and significant backlog risk (probability x consequence).”

| SCORE RANGE | RISK RANKING |
|-------------|--------------|
| 1-10        | LOW          |
| 11-15       | MODERATE     |
| 16-20       | SIGNIFICANT  |
| 21-25       | HIGH         |

| Rating              | PROBABILITY OF FAILURE           |  |   |  |                                      |
|---------------------|----------------------------------|--|---|--|--------------------------------------|
|                     | 1                                | 2  | 3   | 4  | 5                                    |
| Failure descriptors | <b>RARE</b>                      | <b>UNLIKELY</b>                                | <b>POSSIBLE</b>                               | <b>LIKELY</b>                            | <b>CERTAIN</b>                       |
|                     | None or minimal reported failure | Normal wear and tear, limited reported failure | Reportable physical deterioration, repairable | Major physical deterioration, repairable | Full or complete failure, repairable |
|                     | Component life > 10 yrs          | Component life > 10 yrs                        | Component life > 10 yrs                       | Component life > 10 yrs                  | Component life > 10 yrs              |

| SEVERITY               | Health & safety | Environment                    | Business                            | Operational/ building/ engineering element | PROBABILITY OF FAILURE                              |   |    |    |    |    |
|------------------------|-----------------|--------------------------------|-------------------------------------|--|---|---|----|----|----|----|
|                        |                 |                                |                                     |  | 1   | 2 | 3  | 4  | 5  |    |
| Rating                 | Descriptor      |                                |                                     |  |   |   |    |    |    |    |
| POTENTIAL CONSEQUENCES | 1 SIGNIFICANT   | No or minimal impact on people | No or minimal impact on environment | Minor or no impact on business             | Minor or no impact on building/ engineering element | 1 | 2  | 3  | 4  | 5  |
|                        | 2 MINOR         | Minor impact on people         | Minor impact on environment         | Minor impact on business                   | Minor impact on building/ engineering element       | 2 | 4  | 6  | 8  | 10 |
|                        | 3 MODERATE      | Major impact on people         | Major impact on environment         | Major impact on business                   | Major impact on building/ engineering element       | 3 | 6  | 9  | 12 | 15 |
|                        | 4 MAJOR         | Critical impact on people      | Critical impact on environment      | Critical impact on business                | Critical impact on building/ engineering element    | 4 | 8  | 12 | 16 | 20 |
|                        | 5 CATASTROPHIC  | Severe impact on people        | Severe impact on environment        | Severe impact on business                  | Severe impact on building/ engineering element      | 5 | 10 | 15 | 20 | 25 |

$$\text{Risk-adjusted backlog (£)} = \frac{\text{Non-critical backlog}}{\text{Remaining life of building/block}} + \text{Safety-critical backlog}$$



## BM and CIR

- 2009 - NHS buildings faced BM £4.04bn; £1.2bn was needed to eliminate CIR.
- 2013-14 - NHS buildings BM remained at £4.04bn, despite restructuring and increased investments.
- 2016 - Total NHS BM reported as ~ £5.5bn; total NHS CIR reported as ~ £2.7bn, with significant increases in CIR over the past two years, also due to reduction in investments.



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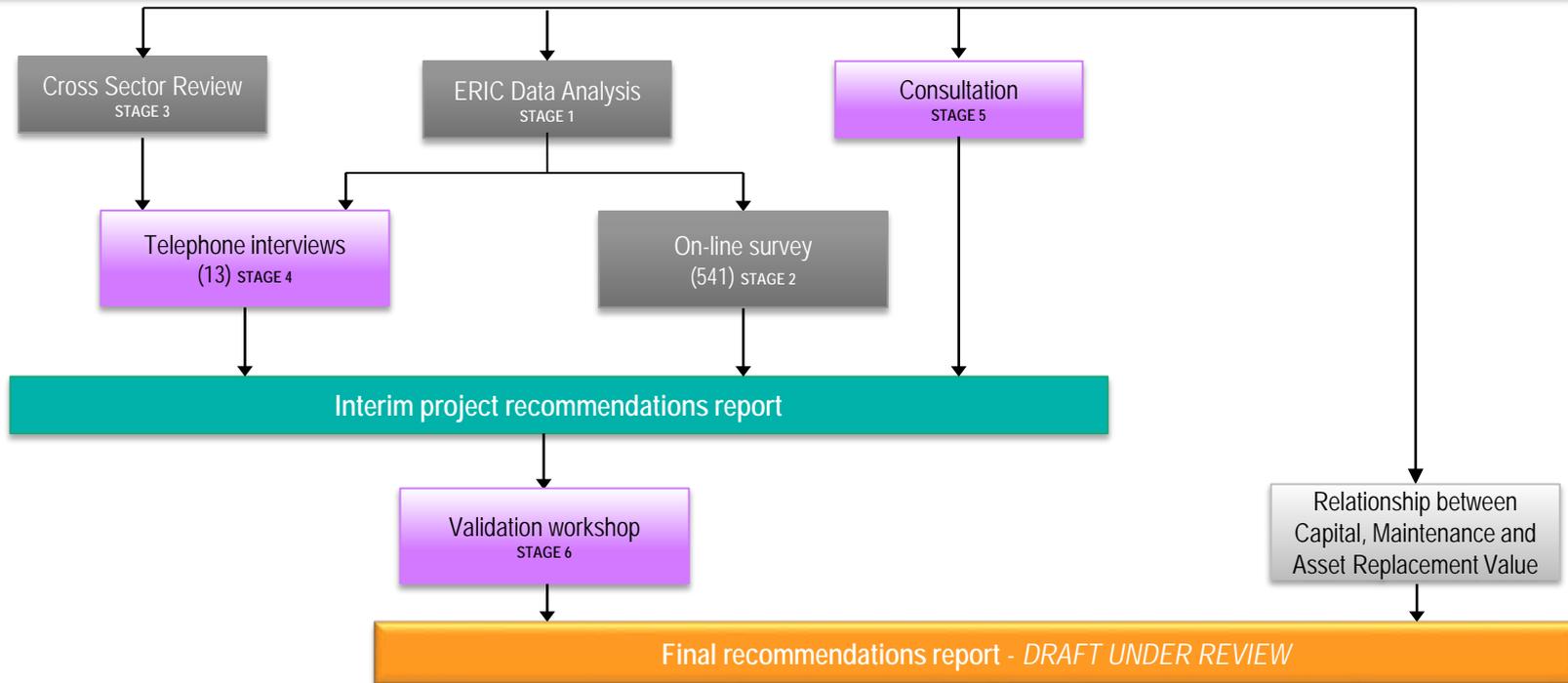
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# Delivery Plan of the research & Methodology of this presentation



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# NHS Estate Backlog Maintenance and Critical Infrastructure Risk Review



## Methodology - 1 of 3

The paper presents the initial findings of:

- a) an on-line survey to all 1213 NHS hospital sites, on main causes of and barriers towards CIR elimination; and
- b) telephone interviews to 13 selected out of 221 NHS hospital trusts, on their critical (i.e. high and significant risks) backlog strategies as opposed to their low and moderate risk strategies.

## Methodology - 2 of 3: survey (a)

- Sent to all 1213 NHS hospital sites with different organisation size, type and amount of CIR.
- 20 questions, based on literature review and telephone conversations.
- Open and closed questions.
- Responses per site or by Aggregate Sites ( $200\text{m}^2 < \text{GIA} < 499\text{m}^2$ ).
- 541 full responses were received within 2 week-period.
- Data were analysed through IBM SPSS© and MS Excel.

## Methodology - 3 of 3: interviews (b)

- 14 trusts sampled according to: 2013-16 data trends; cost to eradicate CIR/OFA; main cost/cost to eradicate CIR; trust income and size; and commissioning region.
- 22 questions (30-45 mins telephone interview) on five themes: CIR and trends; CIR strategy; low and moderate risk backlog strategy; future eradication of CIR; and other sectors' strategies.
- 13 interviews completed over 2 week-period.
- Results were coded and analysed using MS Excel©.



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# Findings



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## Findings - 1 of 2: survey

- Most frequent strategy is to embed in long-term maintenance (34.2%).
- Part-refurbishment is the second most frequent strategy (18.67%).
- "Other" includes: multiple strategies, new buildings and risk transfer to other parties.
- Aggregate sites use be-spoke strategies in relation to specific asset needs.
- Most frequent CIR keyword at site level is electrical systems.
- Issues include: MEP systems, fire systems, structural issues, compartmentation, and asbestos.
- CIR issues are classified as safety (55%) and ~40% of the remaining are safety related. CIR impacts on clinical services.

## Findings - 2 of 2: interviews

- 10 out of 13 Trusts have undertaken a full Six-Facet Survey (e.g. precise identifications of risks and intelligence on estate condition).
- All 13 Trusts have a critical backlog strategy in place and 6 of 13 confirmed it has changed over the past three years.
- 8 out of 13 Trusts do not have a low and moderate risk strategy in place, hence low and moderate backlog is mainly dealt by default, with other redevelopment schemes.
- Most frequent strategy is to embed in long-term maintenance (4 of 13).
- Strategies for low and moderate risks include: Corrective Maintenance, Planned Preventive Maintenance, and combinations of the two.



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# Discussion



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## Discussion - 1 of 3: issues

- Increased confidence in ERIC data reporting compared to the 2013 review, but work still needs to be done.
- Reported levels of BM have increased due to the process, in addition to actual increases.
- The estate is fully utilised in most of the Trusts, and critical backlog appears to be spread across the whole estate.
- The assets include buildings, but also medical and technological equipment that becomes obsolete and unsafe to operate after their end-of-life.
- The newest equipment has a shorter operational life than the older equipment.

## Discussion - 2 of 3: knowledge

- Despite CIR high levels of predictability, large variations in the success of CIR reduction strategies show that pro-active management is possible but accurate knowledge is essential.
- Trusts have clear knowledge of the risks related to different levels of backlog.
- Trusts recognise that PPM is key to addressing high and significant risks, but they also admit the exceptional variability that exists within some sites.
- Trusts admit insufficient consideration of LC issues, and a risky practice as a consequence of the limited capital availability.
- Trusts agree that the current level of investment is not sufficient to ensure critical backlog does not occur.

## Discussion - 3 of 3: strategies

- Historical trends of under-investment in PPM have contributed to recent increases in backlog, and are driving the current approaches.
- Dissimilar strategies are used to address critical backlog (i.e. high and significant) as opposed to low and moderate risk backlog.
- The most frequent strategy is to embed critical backlog maintenance in a long-term maintenance strategy.
- Trusts tend to focus strategies on critical backlog to ensure business continuity and service provision to the public in the safest possible environment.



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# Conclusions and Recommendations



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# Conclusions

- The 13 interviews findings confirmed the 541 survey returns.
- Accurate knowledge of the estate condition is the baseline for action.
- Specific strategies can be applied to achieve targets that are built on knowledge and guided by mutual benefits.
- Trusts focus strategies to ensure business continuity and service provision in the safest possible environment.
- PPM is key to addressing high and significant risk backlog.
- Exceptional variability exists within some sites, and insufficient consideration of LC issues.

# Recommendations

- Embedding CIR reduction strategies within long-term maintenance may lead to sustainable management of built assets.
- Regulations and guidance should be regularly updated to reflect advance in technologies.
- Incentives and penalties can help to promote pro-active approaches and transparent accountability.
- Research in other sectors with real estate assets can provide comparative elements to develop sustainable maintenance strategies.

# Limitations

- This paper is not exhaustive. It presents some of the results out of the national review on NHS Estate Backlog Maintenance and Critical Infrastructure Risk.
- Considerable variations exist amongst NHS trusts, which is a limiting factor towards identifying one single strategy. However, it also provides more opportunities to pursue CIR reduction.

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# Thank you for your kind attention



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