



SMART HOSPITALS

Security and Resilience for
Smart Health Service and Infrastructures

NOVEMBER 2016

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EXECUTIVE SUMMARY

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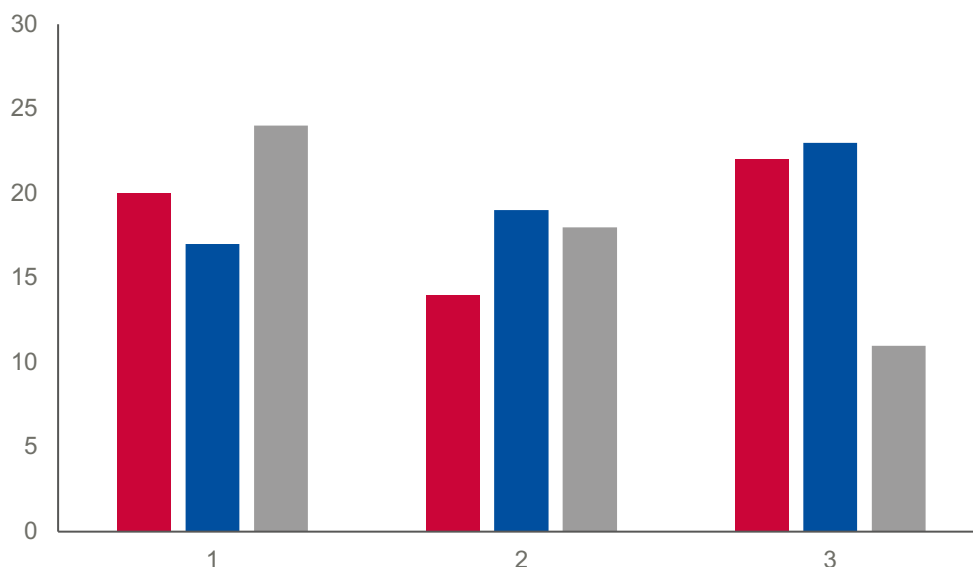
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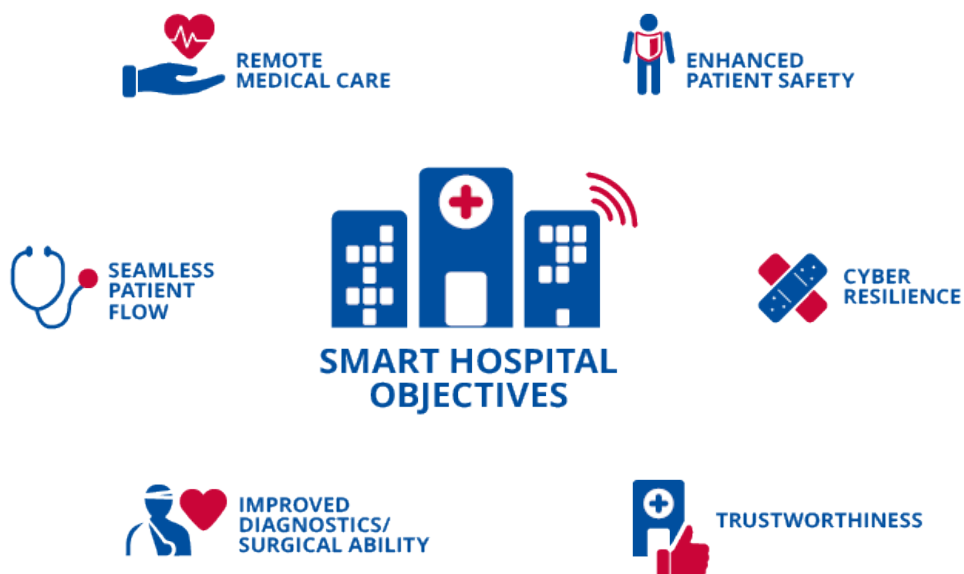
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6. BIBLIOGRAPHY/REFERENCES

Butcher, J., Copy-editing: The Cambridge handbook, Cambridge University Press, Cambridge, 1975, p. 17.

Economic transformation in Hungary and Poland, European Economy No 43, March 1990, Office for Official Publications of the European Communities, Luxembourg, 1990, pp. 151-167.

ENISA, Threat Landscape report, European Union Agency for Network and Information Security, 2014.

Hamm, E., Return of the English breakfast, International Cuisine, Vol. X, No 1, Unwin, London, 1980, pp. 31-34.

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