

# THE EXERCISE IS MEDICINE® GLOBAL RESEARCH AND COLLABORATION CENTER

## USING DATA TO ADVANCE THE IMPLEMENTATION AND IMPACT OF THE EIM SOLUTION

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Physical activity (PA) has a significant role, in many cases comparable or superior to drug interventions<sup>1</sup>, in the prevention and treatment of more than 40 non-communicable chronic diseases (NCDs), such as obesity, heart disease, diabetes, hypertension, cancer, depression, Alzheimer's, arthritis and osteoporosis<sup>2-4</sup>. Insufficient PA was estimated to account for more than 11% of the US aggregated healthcare expenditures in 2014, which translates to \$120 billion dollars/year<sup>5</sup>. Globally, physical inactivity ranks as the fourth leading cause of death<sup>6</sup> and accounts for 9% of premature mortality due to major NCDs<sup>3</sup>. Furthermore, physical inactivity was conservatively estimated to cost \$53.8

billion to healthcare systems, \$13.7 billion in productivity losses and 13.4 million disability-adjusted life years worldwide in 2013<sup>7</sup>. Although low- and middle-income countries bear 75% of the disease burden associated with physical inactivity, more than 80% of healthcare costs and 60% of indirect costs occur in high-income countries<sup>7</sup>.

Physical activity promotion is not yet a standard of care for NCD prevention and management in health systems. This despite the substantial health and economic burden associated with physical inactivity and the fact that ample international evidence supports the effectiveness of PA promotion by the healthcare sector, which includes

both clinical and community care<sup>8-14</sup>. While conceptually simple, implementing clinical-community links for PA promotion is hindered by barriers at multiple levels, such as inadequate training and self-efficacy among healthcare providers (HCPs), insufficient health system support, care team co-ordination and scarcity of certified community resources for referring patients<sup>8</sup>. The challenge for the health sector is how to operationalise and implement these interventions in a cost-effective, sustainable and innovative fashion.

Since 2007 the Exercise is Medicine® (EIM) initiative of the American College of Sports Medicine (ACSM) has helped build local networks to support the systematic



inclusion of PA promotion in healthcare in the United States and more than 40 countries in five continents via the 'EIM Solution'<sup>8</sup>.

If we truly believe that exercise is indeed medicine, then the EIM Solution constitutes the framework to standardise PA-related care – from the assessment of the patient's current PA level, to counselling, written prescription and patient referrals to trusted fitness professionals, and programmes and resources in the community – just as other medical therapies and interventions are standardised. Such a multi-level intervention addressing the noted systemic barriers can help reduce physical inactivity and related NCD burden, healthcare utilisation and cost.

#### THE EIM SOLUTION IN THE CONTEXT OF MODERN HEALTHCARE DELIVERY

In the US and in many other countries, NCDs are responsible for 70 to 80% of the mortality and total healthcare costs, with a huge concentration of spending compressed as NCDs progress along the care-cost continuum<sup>3-5-7</sup>. As a consequence, health payers (employers, insurers, government)

are asking that public and private health systems to share fiscal responsibility for interventions that successfully decrease both the prevalence and economic burden of NCDs. The payer's share of financial risk is determined not only by the number of NCD patients but also by how rapidly such patients become sicker and progress to higher utilisation of the most expensive health services.

Population Health Management (PHM) helps to describe the evolution underway in many health systems by transitioning from volume- to value-based care, especially for population groups diagnosed with one or more NCDs or risk factors, in order to improve patient health across the care continuum and reduce healthcare utilisation and cost. This group typically represents 20 to 30% of a defined population and, in any given year, about a fifth of these patient groups can become high-risk with the resulting high care management needs and associated costs. To identify these individuals, the World Health Organization recommends targeting the shared behavioural risk factors (i.e. unhealthy diets, physical inactivity,

smoking, excessive alcohol consumption) that underlie multiple NCDs<sup>15</sup>. Of these major behavioural risk factors, inactivity has received least attention as a standard of care for NCD management, despite the fact that the US Preventive Services Task Force (among others) supports offering or referring adults at risk of CVD to nutrition and PA counselling<sup>14</sup> ('B' recommendation) an activity that must be included in new health plans under the US healthcare reform law.

#### THE EIM GLOBAL RESEARCH AND COLLABORATION CENTER: DATA DRIVING ACTION

In the last few years the global EIM initiative has transitioned from an initial phase to increase awareness and capacity building to a second phase focused on developing practical and evidence-based methods and protocols for the programmatic implementation of the EIM solution<sup>8</sup>. However, large-scale implementation of the EIM Solution across different countries, populations and healthcare systems is a complex process.

In response to the growing need to perform applied research to guide EIM Solution implementation efforts worldwide, in 2015 the EIM Global Research and Collaboration Center (EIMGRCC) was established as the academic hub leading programme evaluation while collaborating with partnering healthcare systems, community organisations, and fitness and technology companies.

Housed within the Global Diabetes Research Center at Emory University's Hubert Department of Global Health, the EIMGRCC leverages the expertise of leading researchers at Emory University and the global network of ACSM and EIM members to achieve its overall goal of evaluating the real-life effectiveness of the EIM Solution implementation by standardised clinical-community links for PA promotion to help prevent, manage and reverse the progression of chronic diseases.

Specific EIMGRCC Core Objectives include:

1. Serve as a co-ordinating centre and provide technical assistance for multi-centre EIM Solution implementation projects and offer state-of-the-art consultation and evaluation support to health systems and community care networks including the development and validation of effectiveness metrics, behaviour change standards, monitoring frameworks and data collection, aggregation and interpretation needs, to objectively assess the EIM Solution level of reach, effectiveness, adoption, implementation and maintenance, under a population health management framework<sup>16</sup>.
2. Initiate and collaborate on research projects to advance the successful implementation and scale-up of the EIM Solution in the US and globally, using implementation science, integrating objective PA assessments, patient-centred pragmatic trials, information technology and mobile health applications, economic analyses, comparative effectiveness, policy, surveillance, and health services research tools<sup>17</sup>.
3. Collaborate on the development and implementation of a sustainable model to educate the workforce necessary to

#### CONNECTING THE DATA DOTS

Leadership of many health systems indicate that they are reluctant to refer patients to a community resource that cannot show quality assurance equivalent to what patients receive within that same community's clinical settings. This quality assurance is precisely what the EIM Solution provides. Establishing and managing a community network for patient referral with a high degree of quality assurance provides health systems with the essential service that they almost invariably have neither the expertise nor bandwidth to develop internally.

Lifestyle behavioural change requires close human engagement that is significantly enhanced when clinical care integrates community care in a standardised fashion. Health systems are seeking a solution to deliver formerly high-cost services more efficiently in lower-cost settings where patients learn to be better stewards of their own health. EIM's credentialed professionals can provide the engagement methodology needed for advancing patients toward an active lifestyle, including the duration, frequency and intensity of activities necessary to develop the sustained behaviour change and self-efficacy outcomes that lead to self-management and a return on investment for health systems.

Figure 1 shows the EIMGRCC evaluation framework and depicts the integration of clinical care, community care and healthcare cost (claims) data fit together for evaluating EIM effectiveness and cost-

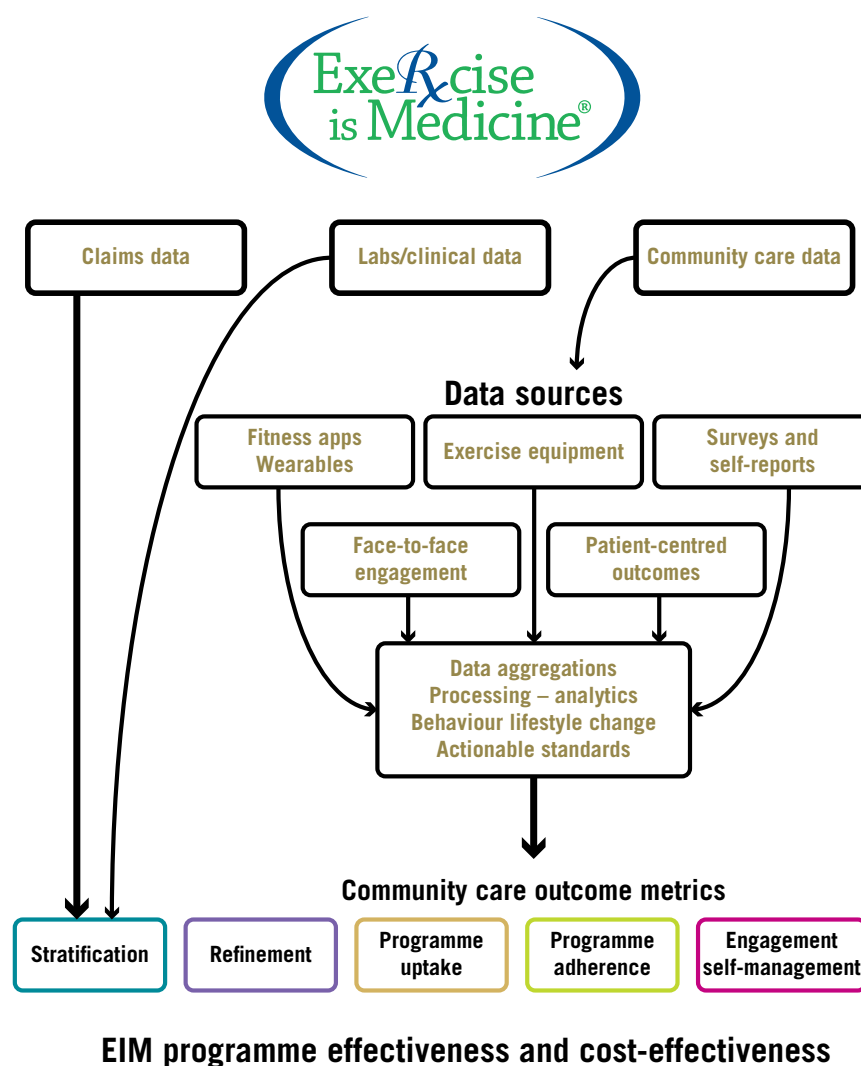


Figure 1: EIMGRCC data collection and evaluation framework.



effectiveness in a given community. The EIMGRCC role is to lead or collaborate with a given health system's in-house research centre to evaluate the impact of EIM Solution programmes.

As part of PHM, we propose that, in addition to clinical and claims health risk data categories, there needs to be a community category to validate the effectiveness of PHM interventions. Quantitative and qualitative community data acquisition tools, including objective PA and other key lifestyle factors (nutrition, sleep, sedentary behaviour) as well as face-to-face and online engagement, surveys, self-reports and patient-centred outcomes provide the source data to define what prevention and intervention programmes must achieve to be relevant.

In addition to examining clinical and claims health risk data, this model includes a community-level category that centres attention on validating the effectiveness of the EIM Solution interventions that have been implemented. The EIMGRCC performs community data standardisation, aggregation and analytics to create actionable summary data and uncover best practices that validate NCD prevention and self-management. Results may be compared across different clinical populations and among specific subgroups. These are the outcomes that lead to a return on investment by health systems from their value-based care and contracted payment models with payers. Value-based payment models will incentivise health systems that integrate community care using a standardised and efficient framework in lower cost settings to improve patient engagement and health outcomes, and reduce healthcare utilisation and cost to achieve the triple aim of healthcare<sup>19</sup>.

#### EIM TECHNOLOGY FRAMEWORK STANDARDS

Until now, the collection of reliable, accurate data on patient lifestyle behaviour – including objective PA data – lacked a clear structure and best practices. In 2016, EIMGRCC investigators established collaborations with:

- Fitness wearable manufacturers
- App developers

***In addition to clinical and claims health risk categories, there needs to be a community category to validate the effectiveness of Population Health Management interventions***

- Large health plans and integrated health systems
- Health information regulatory agencies
- Electronic medical record and data aggregation software companies

The aim was to establish a framework for integrating objective physical activity data into routine healthcare delivery, sharing best practices and developing solutions to integration and implementation challenges<sup>16</sup>.

This framework proposed standards for validity, data privacy and security, clinical utility, meaningful data use, practicality, provision of evidence-based behaviour change strategies and feasibility for integrating mobile health technology tools (apps and fitness wearable devices) in routine healthcare. The framework also discusses how funding bodies and private companies can support academia, researchers and healthcare providers to overcome research gaps and implantation barriers, with a patient-centred, technology agnosticism.

This integration framework blueprint can better guide and lead to more efficient, rapid implementation of mobile health technologies by healthcare systems, providers and consumers.

#### EIMGRCC DATA COLLECTION PLATFORM

To facilitate EIM Solution implementation and evaluation, the EIMGRCC has partnered with a technology company (Quantextual.co) to develop a platform that enables

collection of data that fits the EIM technology framework key principles: empowering patients, technology agnosticism, and ability to share clinical and community care and claims data.

Some of the functionalities of the EIMGRCC app (powered by Quantextual) for key EIM Solution stakeholders are depicted in Figure 2 and include:

From the client or patient's perspective:

- Serve as personal health record manager, linking fitness (any smartphone and/or fitness wearable devices), clinical and laboratory data pulled in a secure and compliant way from the patient's electronic health record data.
- The client/patient is empowered to share his/her own data with any caregiver (clinician, fitness professional) or connect and share data with friends via a secure social network.
- Obtain rewards for specific activities which can be translated to financial rewards or charity donations enabling the use of behavioural economic incentives and gamification programmes in EIM Solution programming.

From the caregiver (clinician or fitness professional) perspective:

- Can interact with the client/patient via secure in-app communication system (manual or automated) based on behavioural thresholds, geo-fencing (location) or other event-based aspects.
- Provider can setup any survey including

the PA vital sign without full electronic medical record integration.

- Provider can see client/patient's dashboard with fitness and lab data colour-coded with pre-established thresholds and can enter manual data.

From the researcher or health system perspective:

- If shared by the patient/client, researchers can automatically obtain 'behind the scenes' all data linked in the app by the patient including behavioural data (PA, diet, sleep), clinical data (laboratory, fitness) and survey data.
- Aids EIM Solution programme delivery, for example access to geo-coded, EIM-vetted fitness programmes, people, places and behavioural economic incentives.
- Can triangulate behavioural change data (attendance, engagement), clinical and claims data to assess effectiveness and cost-effectiveness.

Although these are early stages in this field, there is a need to improve methods

to enhance the representativeness (age, gender, race, socio-economic status, educational levels) of the populations that are willing to share their data for research and evaluation purposes. In the future, platforms that enable pulling data from different apps and devices (i.e. technology agnosticism) as well as better data sharing practices between large technology and software companies are needed. This will ensure that no matter which kind of phone or wearable fitness device the patient chooses to use, the data can be pooled together and standardised so that meaningful comparisons can be made and important information obtained to improve surveillance and population health research. Furthermore, we have pointed out the need for improved practices, frameworks and standards to ensure data from apps and devices are valid, that adequate behaviour change and engagement methodologies are used, that privacy and security standards are met and that the resulting data is clinically meaningful<sup>19</sup>.

The EIMGRCC data collection platform is currently in beta testing and will continued to be improved. A trial version of the patient/client version can be accessed for free via the following links:

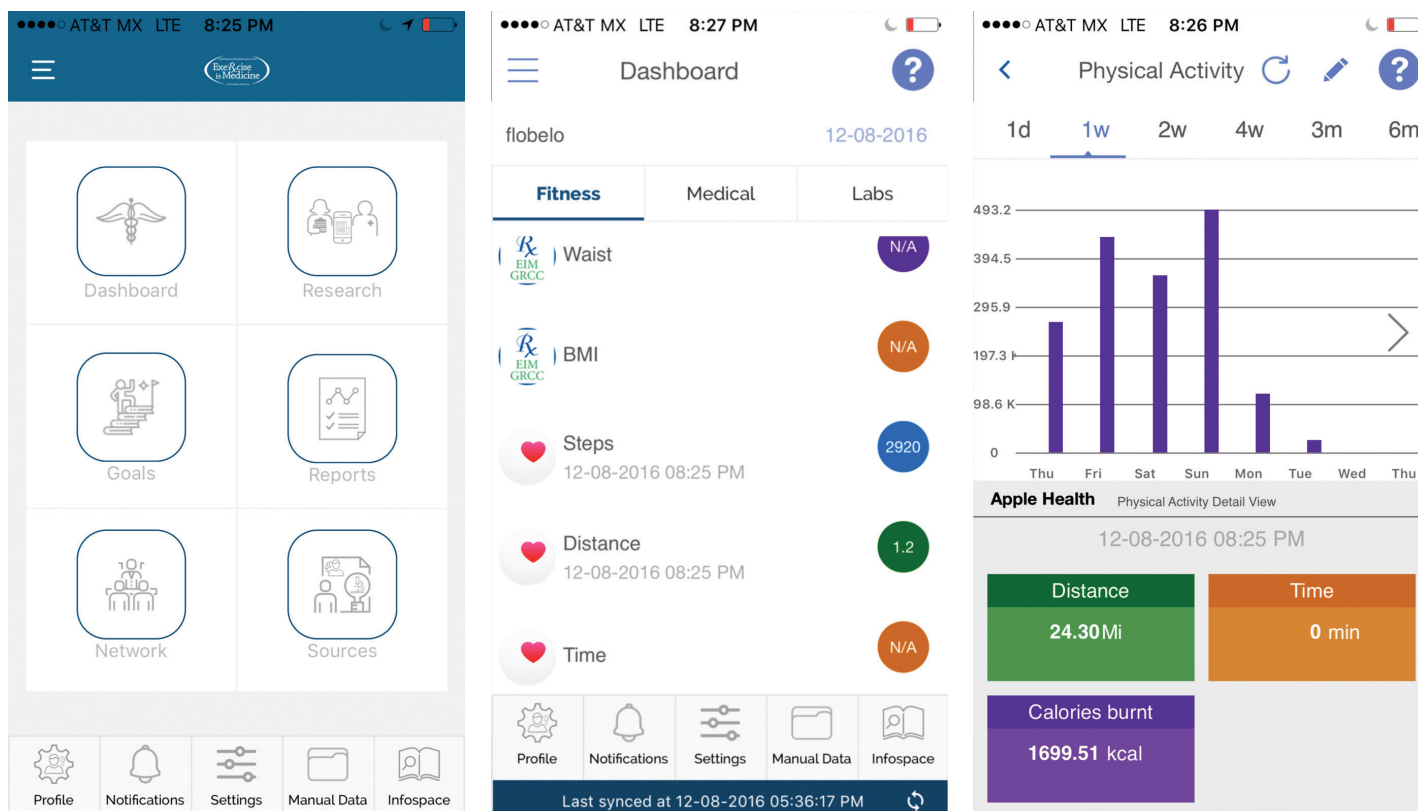
Website: <https://eimgrcctechlab.quantextual.co/individual>

App Store: <https://itunes.apple.com/us/app/eim-grcc/id1181469669?mt=8>

Google Play Store: <https://play.google.com/store/apps/details?id=com.eimgrcc&hl=en>

## CONCLUSION

Until now, most healthcare systems around the world have lacked a standardised community care network. This is necessary as an 'extension' of the clinical setting to enable delivery of sustained PA behaviour change interventions. Furthermore, although most leaders of health systems philosophically believe in the importance of physical activity for NCD prevention and management, concrete local data is needed before decisions are made to divert resources from traditional clinical care



**Figure 2:** The EIMGRCC App powered by Quantextual – a data collection software platform for the EIM Solution.

management activities to community care PA programming. Therefore, critical components required for sustained EIM Solution implementation includes carefully co-ordinated involvement of community stakeholders and simultaneous integration of a rigorous system to evaluate the real-life effectiveness of EIM Solution programming.

In order to advance the EIM mission of making physical activity a standard of care in health systems globally, the EIM Global Research and Collaboration Center has created a robust data collection platform and analytics frameworks. These tools and the technical assistance provided by the EIMGRCC will facilitate the implementation and evaluation of the EIM Solution in the countries that are actively working to integrate clinical-community links for PA promotion and obtain the necessary local data on the effectiveness and cost-effectiveness of these interventions.

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## References

- Huseyin N, John PAI. Comparative effectiveness of exercise and drug interventions on mortality outcomes: metaepidemiological study. *BMJ* 2013; 347:f5577.
- Blair SN. Physical inactivity: the biggest public health problem of the 21st century. *Br J Sports Med* 2009; 43:1-2.
- Lee IM, Shiroma EJ, Lobelo F, Puska P, Blair SN, Katzmarzyk PT et al. Effect of physical inactivity on major non-communicable diseases worldwide: an analysis of burden of disease and life expectancy. *Lancet* 2012; 380:219-229.
- Warburton DE, Charlesworth S, Ivey A, Nettlefold L, Bredin SS. A systematic review of the evidence for Canada's Physical Activity Guidelines for Adults. *Int J Behav Nutr Phys Act* 2010; 7:39.
- Carlson SA, Fulton JE, Pratt M, Yang Z, Adams EK. Inadequate physical activity and health care expenditures in the United States. *Prog Cardiovasc Dis* 2015; 57:315-323.
- World Health Organization. Global Health Risks. Mortality and Burden of Disease Attributable to Selected Major Risks. Geneva, Switzerland: World Health Organization 2009. Available from: [www.who.int/healthinfo/global\\_burden\\_disease/GlobalHealthRisks\\_report\\_full.pdf](http://www.who.int/healthinfo/global_burden_disease/GlobalHealthRisks_report_full.pdf). [Accessed November 2016].
- Ding D, Lawson KD, Kolbe-Alexander TL, Finkelstein EA, Katzmarzyk PT, van Mechelen W et al. The economic burden of physical inactivity: a global analysis of major non-communicable diseases. *Lancet* 2016; 388:1311-1324.
- Lobelo F, Stoutenberg M, Hutber A. The Exercise is Medicine Global Health Initiative: a 2014 update. *Br J Sports Med* 2014; 48:1627-1633.
- Vuori IM, Lavie CJ, Blair SN. Physical activity promotion in the health care system. *Mayo Clinic Proceedings* 2013; 88:1446-1461.
- Orrow G, Kinmonth AL, Sanderson S, Sutton S. Effectiveness of physical activity promotion based in primary care: systematic review and meta-analysis of randomised controlled trials. *BMJ* 2012; 344:e1389.
- Lin JS, O'Connor E, Whitlock EP, Beil TL, Zuber SP, Perdue LA et al. Behavioral Counseling to Promote Physical Activity and a Healthful Diet to Prevent Cardiovascular Disease in Adults: Update of the Evidence for the U.S. Preventive Services Task Force. Evidence Synthesis No. 79. AHRQ Publication No. 11-05149-EF-1. Rockville, Maryland: Agency for Healthcare Research and Quality 2010.
- Pavey TG, Anokye N, Taylor AH, Trueman P, Moxham T, Fox KR et al. The clinical effectiveness and cost-effectiveness of exercise referral schemes: a systematic review and economic evaluation. *Health Technol Assess* 2011; 15:i-xii, 1-254.
- Sanchez A, Bully P, Martinez C, Grandes G. Effectiveness of physical activity promotion interventions in primary care: A review of reviews. *Prev Med* 2015; 76 Suppl:S56-S67.
- LeFevre ML, US Preventive Services Task Force. Behavioral counseling to promote a healthful diet and physical activity for cardiovascular disease prevention in adults with cardiovascular risk factors: U.S. Preventive Services Task Force Recommendation Statement. *Ann Intern Med* 2014; 161:587-593.
- World Health Organization. Draft action plan for the prevention and control of noncommunicable diseases 2013-2020. Available from: [http://apps.who.int/gb/ebwha/pdf\\_files/EB132/B132\\_7-en.pdf](http://apps.who.int/gb/ebwha/pdf_files/EB132/B132_7-en.pdf) [Accessed November 2016].
- Lobelo F, Kelli HM, Tejedor SC, Pratt M, McConnell MV, Martin SS et al. The wild wild West: a framework to integrate mhealth software applications and wearables to support physical activity assessment, counseling and interventions for cardiovascular disease risk reduction. *Prog Cardiovasc Dis* 2016; 58:584-594.
- Gallegos-Carrillo K, García-Peña C, Salmerón J, Salgado-de-Snyder N, Lobelo F. Brief counseling and exercise referral scheme: a pragmatic trial in Mexico. *Am J Prev Med* 2017; 52:249-259.
- Arciniegas Calle MC, Lobelo F, Jiménez MA, Páez DC, Cortés S, de Lima A et al. One-day workshop-based training improves physical activity prescription knowledge in Latin American physicians: a pre-test post-test study. *BMC Public Health* 2016; 16:1224.
- Epperson WJ, Childs SF, Wilhoit G. Provider burnout and patient engagement: the quadruple and quintuple aims. *J Med Pract Manage* 2016; 31:359-363.

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