Vereniging voor Sportgeneeskunde

Bilthoven, 30 januari 2021

Reactie VSG op Discussienota ‘Zorg voor de Toekomst’

Vraag 1 van 5

Herkent u zich in de drie thema’s als de thema’s waar de komende jaren meer verandering op nodig is?

De Vereniging voor Sportgeneeskunde (VSG) is de wetenschappelijke vereniging voor sportartsen. ‘Sportartsen onderscheiden zich van anderen door hun grote expertise en specifieke kennis van het effect van sporten en bewegen op de gezondheid. De erkenning is daarom ook van grote toegevoegde waarde voor de kwaliteit van de zorg voor chronisch zieken en iedereen die sport of beweegt’, aldus minister Schippers. Na deze erkenning van de sportarts als medisch specialist in 2014 heeft de VSG hard gewerkt om de gebruikte kwaliteitsinstrumenten (richtlijnontwikkeling, kwaliteitsvisitaties, deskundigheidsbevordering, accreditatie) te verbeteren en aan te passen aan de eisen, behorend bij de positie als medisch specialist. Het kwaliteitsbeleidsplan VSG 2020-2025 maakt nadrukkelijk verbinding met het visiedocument Medisch Specialist 2025 van de Federatie Medisch Specialisten. Ook de VSG gaat uit van de unieke patiënt, die wordt ondersteund door zorgprofessionals die samenwerken in zorgnetwerken. Als medisch specialisten gaan ook sportartsen voorop in de vernieuwing van de zorg, waarbij er naast de behandeling van ziekte ook een belangrijke rol is weggelegd voor de preventie van ziekte en focus op de kwaliteit van leven. Sportgeneeskunde is mede gericht op leefstijl, waarbij de sportarts verantwoordelijk is voor medisch specialistische beweegzorg. Kortom, de drie thema’s uit de discussienota ‘Zorg voor de Toekomst’ zijn wat de VSG betreft juist gekozen.

Vraag 2 van 5

Herkent u de knelpunten die op (één van) de drie thema’s worden genoemd, of missen er nog belangrijke knelpunten?

De sportarts kent een pluriforme inzet in de zorg, zowel wat het zorgaanbod als het werkterrein betreft. De sportarts heeft als het gaat om preventie en gezondheid een bijzondere positie want het brede werkveld is zowel intra- als extramuraal en zowel curatief als

preventief van aard. Vanuit patiëntenperspectief is de sportarts een medisch specialist met een voorbeeldfunctie richting anderen, zeker ook waar het bewegen als onderdeel van leefstijl betreft: door het multidisciplinaire karakter van de sportgeneeskunde is het functioneren binnen netwerken van zorg een professionele vanzelfsprekendheid voor de sportarts. De juiste zorg op de juiste plek wordt volop toegepast, waarbij de behoefte van de patiënt en de intrinsieke motivatie van de zorgprofessionals leidend zijn. Door niet slechts naar één aandoening te kijken maar naar de mens achter de patiënt én vervolgens risicofactoren en leefstijlfactoren mee te nemen in de behandeling binnen zorgnetwerken. De sportarts is de medisch specialist beweegzorg en per definitie een netwerkspecialist (spin in het web) gericht op samenwerken met andere medisch specialisten en gericht op het verwijzen van de patiënt naar de juiste zorgverlener. De VSG juicht het toe als dit in de zorg beter gefaciliteerd wordt.

Vraag 3 van 5

Welke beleidsopties die genoemd worden bij de drie thema's leveren volgens u een belangrijke bijdrage aan de houdbaarheid van ons zorgstelsel?

Met 'bewegen, als medicijn' ziet de Vereniging voor Sportgeneeskunde veel kansen ter bevordering van een gezonde leefstijl om zo een gezonde omgeving te bevorderen. Het aantal mensen dat lijdt aan een chronische aandoening stijgt. In 2018 telde Nederland 9,9 miljoen mensen met één of meer chronische aandoeningen. Dit komt overeen met 58% van de Nederlandse bevolking. Ruim de helft van deze mensen had meer dan één chronische aandoening [1]. Een van de grootste risicofactoren voor het krijgen van een chronische aandoening is een lage fysieke fitheid (ofwel conditie). Inactiviteit is een pandemie (Lancet 2014 en 2018) en we weten dat bewegen de meest effectieve behandeling is die leidt tot verbetering van fysieke fitheid. Er is overtuigend wetenschappelijk bewijs dat fysieke training bijdraagt aan de preventie en behandeling van chronische aandoeningen. EIM is de afkorting van 'Exercise is Medicine', ofwel 'Bewegen als medicijn'. Bewegen is de enige effectieve behandeling die leidt tot verbetering van fysieke fitheid, ook wel duuruithoudingsvermogen genoemd, en wordt uitgedrukt in zuurstofopnamecapaciteit (VO2). *Zie ook bijlage 1:'Bewegen als medicijn'*

Vraag 4 van 5

Heeft u concrete suggesties om bepaalde opties nader te concretiseren en praktisch vorm te geven?

De mono- en multidisciplinaire toepassing van de kennis van de sportarts is een verrijking voor de beweegzorgketen en geldt als medisch specialistische aanvulling op de expertise van andere zorgprofessionals, zoals de huisarts, fysiotherapeut (bewegingsapparaat), orthopedisch chirurg, cardioloog, longarts en de revalidatiearts. De sportarts heeft een unieke kwaliteit en positie binnen de beweegzorg. Sportartsen hebben naast kennis van diagnostiek en behandeling van het houding- en bewegingsapparaat ook expertise op het gebied van inspanningsdiagnostiek. Als medisch specialist beweegzorg kunnen zij adviseren rondom gepersonaliseerde beweeginterventies bij complex fysieke vraagstukken. De VSG heeft de rechten opgehaald om een National Center Exercise is Medicine in Nederland op te zetten. Hiertoe vinden in het voorjaar 2021 gesprekken plaats met o.a. wetenschappelijke

verenigingen van aanpalende medisch specialismen, de KNGF, patiëntenverenigingen, VWS, FMS en andere maatschappelijke organisaties. Doel is om een beweging op gang te brengen waarbij wetenschappelijke kennis en ervaringen rondom ‘bewegen als medicijn’ in de (preventieve) zorg in Nederland worden verzameld en gedeeld. *Zie ook bijlage 2: ‘Establishing an Exercise is Medicine National Center in Europe’*

Daarnaast is het belangrijk om financiering van preventie in de zorg ruimhartig te omarmen, vanuit maatschappelijk perspectief. Te denken valt aan een systeemaanpak – community health/lifestyle centers en leefstijlpoli’s in ziekenhuizen (PIE=M). *Zie ook bijlage 3: Prevention and Management of Non-Communicable Disease*

We moeten toe naar een situatie waarin ‘Vital signs’ structureel onderdeel zijn van alle elektronische patiënten-dossiers. Dit vraagt ook om een paradigma shift: denken vanuit behoud van gezondheid en niet de behandeling van ziekte.

Vraag 5 van 5

Welke beleidsopties ontbreken er nog?

De Vereniging voor Sportgeneeskunde verwijst voor verdere beleidsopties graag naar de brief met Reactie op Internetconsultatie Contourennota Zorg voor de Toekomst van Prof. dr. P.P.G. (Peter Paul) van Benthem Voorzitter Federatie Medisch Specialisten, d.d. 31 januari 2021.

In de hoop u hiermee voldoende geïnformeerd te hebben, en uitziend naar uw reactie,

hoogachtend

namens de Vereniging voor Sportgeneeskunde,

Harry van der Zaag, directeur

Bijlagen:

- 1. Folder ‘Bewegen als medicijn’ – incl. Infographic
- 2. Info over National Center EIM (kunnen we daarover iets meesturen?)
- 3. Prevention and Management of Non-Communicable Disease

Bewegen als Medicijn

Vereniging voor Sportgeneeskunde

Bewegen is gezond!
Bewegen is gezond voor alle leeftijdsgroepen. Het gaat daarbij zowel om activiteiten gericht op uithoudingsvermogen als om kracht. Dit principe is breed gedragen en wordt beschouwd als een cruciaal onderdeel van een gezonde leefstijl.

In januari 2018 voldeed 54% van de Nederlandse bevolking niet aan de beweegrichtlijn[1] en had 58% van de Nederlandse bevolking een chronische aandoening.

1. Bron: Nivel, Zorgregistraties eerstelijn

Wat is EIM?
EIM is de afkorting van 'Exercise is Medicine', ofwel 'Bewegen als medicijn'. Bewegen is de enige effectieve behandeling die leidt tot verbetering van fysieke fitheid, ook wel duuruithoudingsvermogen genoemd, en wordt uitgedrukt in zuurstofopnamecapaciteit (VO2).

Waar komt het vandaan?
De term EIM komt uit de Verenigde Staten (www.exerciseismedicine.org) en heeft in Europa een zusterorganisatie: European Initiative in Exercise is Medicine (EIEIM). De Vereniging voor Sportgeneeskunde (VSG) is aangesloten bij het EIEIM en heeft het initiatief genomen om in Nederland een multidisciplinair National Center EIM op te zetten.

Wat kun je ermee? Wat beoogt het?
Doel van het wereldwijde initiatief is om bewegen een standaard onderdeel te laten zijn van een medische behandeling. Daarmee wordt beoogd om te komen van 'ziekte en zorg' naar 'gezondheid en gedrag'; een impuls richting gezonde leefstijl!
Fysieke fitheid blijkt een sterke en onafhankelijke voorspeller te zijn voor de kwaliteit van leven en voor ziekte- en sterftecijfers. Dat geldt zowel voor gezonde volwassenen als voor volwassenen met een chronische aandoening. Fysieke fitheid lijkt een betere voorspeller te zijn dan de klassieke risicofactoren, zoals roken, hypertensie, hypercholesterolemie en Diabetes Mellitus type 2. Fitheid is daarmee van grote waarde bij medische besluitvorming: 'De juiste zorg op de juiste plaats!'

What's new?
We wisten toch al dat beweging goed is voor een mens! Dat klopt. Relatief nieuw is dat het verbeteren van de fysieke fitheid ook een positief effect lijkt te hebben op diverse chronische, oncologische aandoeningen, psychische aandoeningen en vermindering geeft ~~van~~ op complicaties rond grote chirurgische ingrepen.

Waarom nú deze boodschap?
Met de toenemende inactiviteit en de stijging van aantal mensen met 1 of meer chronische aandoeningen en daarmee de zorgkosten is het tijd voor een goedkope en effectieve therapie.

Wat is de rol van de sportarts? *'Voor bewegen als medicijn, moet u bij de sportarts zijn'*
De sportarts heeft als nieuw erkend medisch specialist sinds 2014 een belangrijke rol. Voormalig minister Schippers (VWS) beschreef het als volgt: 'Sportartsen onderscheiden zich van anderen door hun grote expertise en specifieke kennis van het effect van sporten en bewegen op de gezondheid'. 'De erkenning is daarom ook van grote toegevoegde waarde voor de kwaliteit van zorg voor chronisch zieken en iedereen die sport of beweegt. De mono- en multidisciplinaire toepassing van de kennis van de sportarts is een verrijking voor de beweegzorgketen en geldt als medisch specialistische aanvulling op de expertise van andere zorgprofessionals, zoals de huisarts, fysiotherapeut (bewegingsapparaat), orthopedisch chirurg, cardioloog, longarts en de revalidatiearts.

'Sportarts is medisch specialist beweegzorg'
De sportarts heeft een unieke kwaliteit en positie binnen de beweegzorg. Sportartsen hebben naast kennis van diagnostiek en behandeling van het houding- en bewegingsapparaat expertise op het gebied van inspanningsdiagnostiek en kunnen adviseren rondom gepersonaliseerde beweeginterventies bij complex fysieke vraagstukken.

Waarom is EIM belangrijk?

- EIM levert een positieve bijdrage aan de kwaliteit van leven, gezondheid en levensverwachting
- EIM levert een doelmatige, effectieve en kostenefficiënte bijdrage aan de gezondheidszorg bij mensen met chronische aandoeningen, kanker, en perioperatieve risicoreductie bij grote vaat-, buik-, oncologische en/of orthopedische ingrepen zoals gewrichtsvervangingen.

Feit

Een gemiddeld tot goede conditie bij mensen met een chronische aandoeningen is geassocieerd met een verlaging van het overlijdensrisico:

*50-70% vermindering bij diabetes type 2,
*35-75% bij hart- en vaatziekten,
*55-83% bij kanker en
*41-55% bij gezonde ouderen[2].

- Better in, better out! EIM is bewezen effectief bij perioperatief beleid.

2. Bron resp.:.Diabetes Care 2020, Sports medicine 2018, Obesity 2017, J Gerontol A Biol Sci Med Sci 2009)

MEDISCH SPECIALISTISCHE BEWEEGZORG

BEWEGEN ALS MEDICIJN

1. TRAINING KRACHT EN UITHOUDINGSVERMOGEN VOOR IEDEREEN

2. VERBETERING
   - KWALITEIT VAN LEVEN
   - GEZONDHEID
   - LEVENSVERWACHTING

3. DOELMATIGE BIJDRAGE GEZONDHEIDSZORG CHRONISCHE AANDOENINGEN

INDICATIES MEDISCH SPECIALISTISCHE BEWEEGZORG

- UITBLIJVEN HERSTEL FYSIEKE FITHEID ONDANKS BEWEEGZORG EERSTELIJN
  - ADL
  - WERK
  - SPORT
- AFWIJKEND BELOOP BEWEEGZORG EERSTELIJN
  - ONBEGREPEN DYSPNOE
  - ASPECIFIEKE THORACALE KLACHTEN
  - AANHOUDENDE VERMOEIDHEID
  - BEWEGINGSANGST
- COMPLEXITEIT ZORGVRAAG
  - BEPERKENDE CO-MORBIDITEIT
  - (POTENTIËLE) BIJWERKINGEN/ NEVENSCHADE BEHANDELING
- INDIEN MEERVOUDIG COMPLEX: MEDISCH SPECIALISTISCHE REVALIDATIEZORG

INHOUD PROGRAMMA

ANAMNESE EN LICHAMELIJK ONDERZOEK (INCL. SCREENING BEWEGINGSAPPARAAT)

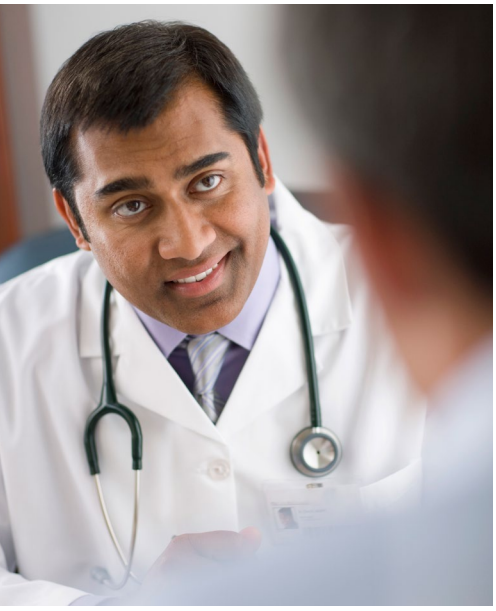
INSPANNINGSDIAGNOSTIEK T.B.V.
- RISICOANALYSE
- BEPALEN OORZAAK BEPERKING
- VASTSTELLEN BELASTBAARHEID
- PROGNOSE

BEHANDELPLAN
- GEPERSONALISEERDE BEWEEGINTERVENTIE
- VOEDINGSADVIES

EVALUATIE EN ZO NODIG BIJSTELLEN BEHANDELPLAN

VERENIGING VOOR SPORTGENEESKUNDE

Establishing an Exercise is Medicine® National Center in Europe



EUROPEAN INITIATIVE FOR EXERCISE IN MEDICINE

REBRANDING MEDICAL COUNSELING FOR HEALTH

Your Prescription for Health

ExeRcise is Medicine®

http://exerciseismedicine.eu/

Table of Contents

1.0 Introduction

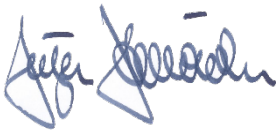
This manual is designed to assist you in your efforts to introduce Exercise is Medicine® (EIM) in your country. The EIM initiative seeks to advance the integration of physical activity into health systems as a standard in patient care for the prevention and treatment of chronic diseases.

Outlined in this manual are the specific steps required in developing an EIM National Center. These steps are intended to assist future partners develop a sustainable, multi-sectoral program that unites leaders from medicine, healthcare administration, public health, and exercise science. While the specific steps outlined in this manual may need to be adapted to your particular country, the underlying principles have evolved from our efforts in introducing EIM in more than 40 countries around the world.

As you advance through the process of developing a National Center, we encourage you to work closely with the EIM Global Center and the European Initiative for Exercise in Medicine® e.V. (EIEIM). Both the EIM Global and the EIEIM exist to provide you with guidance and support to make this process as seamless and efficient as possible.

Thank you for dedicating the time and effort in bringing EIM to your country. We feel that the promotion of physical activity through the healthcare sector is an extremely important initiative that has the potential to make a significant impact on the future health and wellness of a large segment of our population. We look forward to developing EIM in your country with you in the future!

Adrian Hutber, PhD
Vice-President, Exercise is Medicine®
American College of Sports Medicine



Jürgen Steinacker, MD, Dr. med,
Chair, European Initiative for Exercise in Medicine®

2.0 Initial Steps

2.1 Determine EIM Presence in Your Country

The first step in the process of establishing an EIM National Center is to determine whether other individuals have established, or are working to establish, a National Center in your country. The easiest way to make this determination is to check the EIM Global Directory (http://www.exerciseismedicine.org/eim_map).

If an EIM National Center **already exists** in your country, please consider the following options in getting involved with the initiative:

- Support Your National Center Advisory Board – there are numerous opportunities for individuals from all fields and disciplines to become involved with EIM. To truly achieve a population level impact, National Centers are in need of all the assistance they can get. Contact you're the leadership of your EIM National Center using the email link on our EIM Global Directory webpage to discuss ways that you can get involved.
- Become part of the EIM Network – If you are not interested in a leadership role, there are numerous other ways to become involved. Work with your Advisory Board to implement EIM in your local region or become part of an EIM Professional Network being developed in your country.

If EIM **does not** exist in your country, we suggest that you begin by contacting the EIM Global Center. There may be individuals currently working to establish an EIM National Center with whom you can be connected. If no progress is currently underway in your country, we ask you to consider the following questions:

- What is your overall interest in working with Exercise is Medicine®?
- Are you interested in being part of a leadership team that oversees a multi-sectoral, national initiative?
- Are you willing to dedicate a significant amount of time, likely as a volunteer, over the next few years in developing EIM in your country?
- Or are you more interested in a specific area or sector of EIM (i.e., exercise professionals)?

We ask that you carefully consider these questions as taking on a leadership role in establishing an EIM National Center is a time-intensive activity that requires excellent collaborative and leadership skills, dedication, sacrifice, and flexibility in your schedule. If this sounds like something you are interested in being a part of - we encourage you to keep reading!

2.2 Determine Level of National Interest

For EIM to be successfully launched in a country, it is necessary to develop support for the initiative across a broad of leaders. Prior to starting the process of creating an EIM National Center, we suggest that you start by contacting national healthcare leaders and stakeholders to determine their level of interest in joining EIM. It is essential to identify and engage leading healthcare providers and their associations, public health officials, community leaders, exercise professionals, and other key stakeholders to ensure the success of your EIM National Center!

3.0 Developing an EIM National Task Force

3.1 Engaging Key Stakeholders

The next step in the process of establishing an EIM National Center is to convene a series of stakeholder meetings with key representatives with the goal of forming a temporary National Task Force (NTF). The NTF serves as the initial organizing body that will guide the formation of the National Center. Upon formation of the National Center, the NTF formally disbands and is replaced by the National Center Advisory Board.

It is essential that leaders from multiple professional fields and organizations are contacted and invited to participate in the initial EIM National Task Force Meeting(s). While there are no restrictions on the size and composition of the NTF, it is critical that stakeholders from all major sectors be included in these meetings from the very beginning. When identifying key stakeholders, four main objectives should be kept in mind:

1. Seek Partnerships with National Organizations. As you reach out to different leaders in your country, we encourage you to contact national organizations related to EIM, such as primary care, sports medicine, geriatrics/pediatrics, and exercise science. Involving these national organizations and/or institutions will give your National Center greater reach in establishing national presence, increasing your future impact.
2. Select Stakeholders Who Are Leaders in their Respective Fields. Key stakeholders should be leaders, and not just members, within their respective fields. These individuals should represent their associations and report back directly to the leadership of the association on the progress of the NTF.
3. Multi-Sectoral Representation. For EIM to be successful in a country there must be representative from multiple sectors. An NTF consisting primarily of medical representatives will lack the valuable perspective of exercise professionals and establishing linkages to existing community resources. In contrast, an NTF dominated by exercise scientists/exercise professionals may struggle to understand the complexities involved with integrating physical activity into a healthcare system.
4. Balance of Senior and Rising Professionals. In selecting individuals to participate in the initial NTF meetings, it is important to establish a balance between senior leaders and rising professionals. Typically, established leaders have a wide network of connections and vast experience in their field, but may have limited time to dedicate towards establishing and maintaining a National Center. Conversely, rising professionals may not yet have the same professional network or work experience, but may be more willing and able to dedicate their time and effort to advancing the mission, goals and programs of the National Center.

3.2 Convening National Task Force (NTF) Meetings

Once key stakeholders have been identified and engaged, the next step is to host a series of meetings that will lead to the formation of a NTF. It is important to remember that the NTF is a temporary leadership group established to explore the possibility of bringing EIM to your country. Therefore, these initial meetings should be exploratory in nature to discuss the

strengths that each key stakeholder brings to the table, opportunities and readiness for introducing EIM to your country, and to identify additional individuals and groups that should be included in the NTF meetings. Due to the national scope of the NTF, these meetings do not have to be conducted in person. We encourage groups to explore other methods (i.e., conference calls, group skype calls) to reduce the time and burden on stakeholders to participate in these initial talks.

As the NTF meetings progress, members should begin to focus on the following objectives:

- Discussing the mission and vision of the National Center (Appendix A);
- Identifying the priority initiatives of the National Center that are in alignment with the established mission and vision;
- Developing a series of short- and long-term goals, as well as timelines for these goals, over the upcoming one to five years;
- Determining the basic structure of the EIM National Center;
- Identifying the key stakeholders who will serve as the National Center Advisory Board members;
- Selecting an individual(s) who will serve as the Director of the National Center;
- If resources are available, discussing the selection and hiring of a Program Manager for the National Center;
- Selecting an institution that will officially host the National Center (see section 4.2).

4.0 Establishing the EIM National Center (NC)

4.1 Selecting the EIM National Center Advisory Board

As the members of the NTF complete the objectives listed in the previous section, the focus turns to transitioning to an official EIM National Center with the end goal of signing a Memorandum of Understanding (MOU) with the American College of Sports Medicine (ACSM), which hosts the EIM Global Center, and the EIEIM.

The first step in this process will be the selection of a permanent National Center Advisory Board. The MOU states that a National Center Advisory Board (NCAB) shall consist of at least five members. NCAB membership shall include at least one official representative (unless exempted by the EIEIM) drawn from each of the following stakeholder groups:

1) a national primary care physician organization; and,
2) a national sports medicine and/or sports science organization.

* NC shall contact the Ministry of Health or similar governmental agency with authority over health in the Territory and invite the agency to appoint a representative to membership on the NCAB.

* NC is highly encouraged to invite an academic representative for membership on the NCAB.

* Other representatives from national organizations considered necessary for the long-term success of the EIM National Center may also be included as Advisory Board members.

There is no maximum number of NCAB members. However, to maintain equal representation of all sectors on the Advisory Board, **each organization represented on the NCAB shall have only one representative from a single organization, including the host institution**, unless exempted by the EIEIM. Additional individuals from the same organization may serve as non-voting members of the Advisory Board or lead working groups and sub-committees. The term length and function of Advisory Board Members shall be determined by the by-laws established by each EIM National Center (see section 4.3).

A list of the individuals and their voting status on the National Center Advisory Board is a required component of the MOU (see Appendix B). The EIM Global Center will request for this documentation to be updated annually by the National Center Advisory Board (see section 6.3).

4.2 Identifying a Host Institution

EIM National Centers must be “hosted” by an official institution/organization in each country to provide long-term stability. Potential host institutions may include academic centers (i.e., a university or college), non-profit organizations (i.e., a national sports medicine organization), or a healthcare system. The host institution will be responsible for the legal charter of the National Center, as well as receiving and distributing any funds generated (i.e., fundraising donations, sponsorships).

- We recommend that a host institution not be a part of a government institution. While the involvement of government institutions is highly encouraged, elected officials and their programs change, resulting in a shift in focus and priorities. This may lead to long-term instability of an EIM National Center. There is a greater likelihood of long-term

stability of a National if it is located in a more stable organization, such as a national sports medicine association.

- We also strongly recommend that an EIM National Center not be hosted in a small non-profit organization (or NGO) created by the Advisory Board for the express purpose of establishing an EIM National Center. Hosting the National Center in a private NGO may raise questions regarding the appearance of transparency, and may also limit the national scope and prominence of the initiative in the future.
- A last, but extremely important point, is that the MOU states that the host institution shall not retain control over the EIM National Center, its finances, academic property, or its activities. The host institution may place only one voting member on the Advisory Board. This clause has been added to the MOU to prevent a host institution from seizing control of the initiative and acting in their own best interests and against the desires of the Advisory Board.

Once a host institution has been identified, a brief description and logo of the institution will be required as a part of the National Center Launch Documentation (see Appendix C).

4.3 Ratifying the Governance Structure of the EIM National Center

A next recommended step is the development of by-laws to outline the governance structure and operating code for the EIM National Center. Items that should be spelled out in the by-laws include: selection of Advisory Board Members, election of Advisory Board leadership (i.e., the National Center Director), term limits, Advisory Board meeting schedule, voting procedures of the Advisory Board, governance of working groups, and oversight of National Center sponsored initiatives and programs. A modifiable template of National Center by-laws can be found on the Global Center website or by request of an EIM Global Center team member.

Key issues that must be developed by the National Center, which will be requested as a part of the EIM National Center Launch Documentation (see Appendix B), include:

- A mission and vision of the National Center;
- Priority initiatives of the National Center to achieve the mission and vision;
- Short- and long-term goals.

4.4 Completing EIEIM

A final requirement before officially completing the MOU is the completion of the EIEIM membership form and payment of dues. An example of the EIEIM membership form is found in Appendix D. Annual dues for membership in the EIEIM are 15 €/year. The MOU cannot be signed until the membership form has been completed and dues are paid.

5.0 Completing the Memorandum of Understanding

After completing the steps outlined in section 4.0, the official completion of the MOU will include the following steps:

1. Request the most recent version of the MOU from the EIM Global Center.
2. Review the MOU with representatives from the EIM Global and EIEIM to ensure that the terms are understood and acceptable for all parties involved.
3. The MOU may be translated to the primary language of the National Center. However, the translation of the MOU shall be completed by the host country. An English version must be signed along with any translated versions. If there are any discrepancies in the language or interpretation of the MOUs, the English version will serve as the final version.
4. The signing institution shall enter information on page one detailing the date of the signing, the name and address of the host institution, and the country of the National Center. If the MOU is being completed in another language besides English, this should be updated on page 4.
5. The official representative from the host institution shall initial and date pages 1-3 and 5 in the lower right hand corner before signing and dating the MOU on page 4.
6. The official signing may be done at any time or place. However, the MOU shall be signed first by the host institution, followed by the EIEIM Regional Director, and lastly by the CEO/Executive Vice President of ACSM. The signing of the MOU presents an opportunity to market and increase public awareness of EIM. Consider hosting a press conference and providing press releases of the official signing to local and national news and social media agencies. You may also elect to complete the signing of the MOU at an annual conference of the host organization.
7. Scan and email an electronic version of the signed MOU (or mail a hard copy of the signed documents if preferred) to the EIM Global Center.
8. The documentation will be sent to Dr. Jürgen Steinacker, Director of the EIEIM Regional Center, for his signature.
9. Finally, Mr. Jim Whitehead, the Executive Vice President and CEO of the American College of Sports Medicine, will sign the MOU officially establishing the EIM National Center.
10. An EIM Global Center team member will provide your team with either a scanned copy of the final document (via email) or a hard copy (if specifically requested) signed by all involved parties.

Figure 1. Overview of the process for establishing an EIM National Center.

6.0 EIM National Center Administration

6.1 Developing Executive Committees and Working Groups/Sub-Committees

Although only one member of a representative organization is permitted to serve as a voting member of the Advisory Board, it is highly recommend that, under the guidance of the Advisory Board, additional structures be developed within the National Center to engage other members, such as working groups and sub-committees that are tasked with specific functions for the EIM National Center. The NC Advisory Board may also elect to create an Executive Committee that carries out the day-to-day functions of the NC under the guidance of the Advisory Board.

In developing the mission and goals of the National Center, it is important to similarly align the administrative structure to help achieve these goals. Example of these functions could include: a) marketing and outreach, b) community engagement, c) research and evaluation, d) clinical practices, and e) credentialing and training.

6.2 Education, Training & Program Implementation

The EIM Global Center strongly encourages each National Center to make one or more of the following strategies a focal point of their EIM programming:

1. Education and training of healthcare providers
2. Education and training of exercise professionals
3. Implementing the EIM Solution in healthcare systems

These three strategies embody the basic principles of EIM and should be considered as essential elements of a successful National Center. To this end, it is highly recommended that separate working groups or sub-committees be developed to specifically oversee the growth of each of these strategies.

6.3 Annual Reporting

The EIM Global Center reserves the right to request updates on activities performed by EIM global partners on an ongoing basis. These updates may include, but are not limited to: the number of EIM educational trainings conducted, the number of professionals trained, the number of healthcare or fitness professionals in their professional network, and the number of hospitals and healthcare systems that have adopted the EIM solution. This information should be maintained by each NC as part of their ongoing evaluation and data recording process.

The EIM Global Center also reserves the right to request annual updates on the structure and function of the NC. These updates may include, but are not limited to: updated contact information for the NC Director, Manager, and Advisory Board Members, a description of activities and accomplishments from the previous year, reports from the NC Advisory Board meetings and communications from the previous year, and goals for the upcoming year.

7.0 EIM National Center Launch Sequence Checklist

- ☐ Identify whether EIM currently exists in your country
- ☐ Contact the EIM Global Center to express interest in bringing EIM to your country
- ☐ Convene a series of meetings with key stakeholders in your country working together as an EIM National Task Force
- ☐ National Task Force members create a framework for the by-laws of the future EIM National Center that include a mission and vision, as well as short- and long-term goals
- ☐ Elect a National Center Director and Advisory Board Members to oversee the direction and growth of the EIM National Center
- ☐ Identify a host institution for the EIM National Center
- ☐ Complete the EIM National Center Launch Documentation
    - o Mission & Vision of the National Center
    - o National Center Goals
    - o Information on host institution
    - o List of Advisory Board Members
- ☐ Download and complete the EIEIM membership form
- ☐ Pay annual EIEIM membership fee
- ☐ Complete the official signing of the EIM National Center MOU with the EIEIM and the ACSM

Appendix A – Mission and Goals of EIM National Center

Mission of the EIM *(insert country name here)* National Center

The Mission of the EIM _____ National Center is to make physical activity and exercise a standard part of a disease prevention and treatment medical paradigm in _____.

The Vision of the EIM _____ National Center is for physical activity to be considered by all healthcare providers as a vital sign in every patient visit, and that patients are effectively counselled and referred as to their physical activity and health needs, thus leading to overall improvement in the public's health and long-term reduction in health care cost.

Goals of the EIM *(insert country name here)* National Center

The Goals of the EIM _____ National Center are to:

1. To increase the number of healthcare professionals who are assessing, prescribing and counselling patients in physical activity;
2. To increase the number of individuals meeting the _____ Physical Activity Guidelines; and
3. To encourage the appropriate use of qualified exercise professionals in the prevention and treatment of chronic disease.

Appendix B – Description of National Center Advisory Board Members

The EIM *(insert country name here)* National Center Advisory Board consists of the following members representing the following organization(s):

Member Name & Advisory Board Position	Organization & Position	Member Contact Information (email & phone)
1. John Doe, MD Professor	National Association of… Director of…	johndoe@hotmail.com (011) 57-320-1212
2. John Doe, MD Professor	National Association of… Director of…	johndoe@hotmail.com (011) 57-320-1212
3. John Doe, MD Professor	National Association of… Director of…	johndoe@hotmail.com (011) 57-320-1212
4. John Doe, MD Professor	National Association of… Director of…	johndoe@hotmail.com (011) 57-320-1212
5. John Doe, MD Professor	National Association of… Director of…	johndoe@hotmail.com (011) 57-320-1212
6. John Doe, MD Professor	National Association of… Director of…	johndoe@hotmail.com (011) 57-320-1212
7. John Doe, MD Professor	National Association of… Director of…	johndoe@hotmail.com (011) 57-320-1212
8. John Doe, MD Professor	National Association of… Director of…	johndoe@hotmail.com (011) 57-320-1212
9. John Doe, MD Professor	National Association of… Director of…	johndoe@hotmail.com (011) 57-320-1212
10. John Doe, MD Professor	National Association of… Director of…	johndoe@hotmail.com (011) 57-320-1212

Appendix C – Description of Host Institution for the EIM National Center

Example – The Changi Sports Medicine Centre (EIM Singapore)

Changi Sports Medicine Centre is the largest multi-disciplinary sports medicine centre in Singapore, equipped with the latest technologies and a fully equipped gym for sports injury treatment and rehabilitation, performance enhancement, and weight management. The centre provides multidisciplinary care under one roof, with Sports Physicians, Sports Orthopaedic Surgeons, Sports Physiotherapists, Sports Trainers, Sports Dietitians and Sports Podiatrists to deliver integrated and holistic care for athletes.

Appendix D - Example of the EIEIM Membership Application Form

National Center - Application Form: Expression of Interest

Please complete this form and all required documents (see checklist) per email to:
Mark Stoutenberg: MStoutenberg@med.miami.edu
and cc to Lisa Kempter: lisa.kempter@uniklinik-ulm.de

Applicant Contact Information

1. Country for the EIM National Center:

_____

2. Corresponding person:

Mr. ☐ **Mrs.** ☐ **Dr.** ☐ **Prof.** ☐

First name: _____ **Address:** _____

Surname: _____ **Postcode/town:** _____

Profession: _____ **Country:** _____

Email: _____ **Telephone/Fax:** _____

3. Possible Members in the European Initiative for Exercise in Medicine e.V. (EIEIM)

National Centers
Exercise is Medicine® National Centers (one from every European state) support the mission of the EIEIM to promote health by increasing participation in physical activity. Membership applications will be reviewed by the EIM Global Center (ACSM) and the board of EIEIM. Please find further details in the EIM National Center Launch docum(ent.

Supporting organizations
Supporting organizations are European Organizations which would like to support the EIEIM and make use of the benefits, including usage of the logo (additional contract required) and/or getting allowance on the annual EIEIM congress fees. Supporting organization do not have a voting right.

4. Membership fee

After approval of the application for membership, the regular membership fee (**15 €/year)** is due. Payment will be executed by SEPA Bank collection. There is no separate application fee.

Acknowledgement

By my signature I acknowledge the valid statutes of EIEIM as binding. I agree to the storage, transmission and processing of my personal data for purposes of the association, according to the regulations of the data protection act. The EIEIM statutes can be downloaded from our website: http://exerciseismedicine.eu.

I hereby express my interest for membership in the **European Initiative for Exercise in Medicine (EIEIM)**. I have read the statutes and conditions and I understand the privileges and responsibilities of membership. I certify that the statements on this application are true.

Place: _____ Date: _____

Signature: _____

EIM License and Operational Guidelines Agreement for EIM National Centers

This **EIM LICENSE AND MEMORANDUM OF UNDERSTANDING AGREEMENT FOR EIM NATIONAL CENTERS** (the "Agreement") is made and entered into as of the 13 January 2017 (the "Effective Date"), by and between **LEGAL NAME**-, a corporation organized under the laws of **COUNTRY** with its principle place of business at **LEGAL SEAT** ("Licensee") and the **American College of Sports Medicine (ACSM)**, a nonprofit corporation with its headquarters at 401 West Michigan Street, Indianapolis, Indiana 46202, United States of America.

This Agreement includes also the **European Initiative Exercise in Medicine e. V.**, a democratic association of European National Initiatives for Exercise in Medicine organized under the laws of Germany with its principle place of business at Ulm, Germany ("EIEIM").

In consideration of the mutual agreements contained herein and other good and valuable consideration, the receipt and legal sufficiency of which are hereby acknowledged, both EIM Partners, intending to be legally bound, hereby agree as follows:

1. Common Goals:

i. Promoting the concept that physical activity: (1) is integral to the prevention, cure and care of disease and should be a standard part of the disease prevention and medical treatment paradigm; (2) should be regularly assessed as part of all medical practice; and, (3) should be considered as a vital sign by all health care providers for patients to be effectively counseled by their physician, including referral to a qualified health, fitness or allied health professional for further counseling.

ii. Promoting public awareness of physical activity, fitness, health, and wellness, highlighting the importance of health service providers in maintaining and improving fitness, health and wellness and generating research evidence for the cost effectiveness of physical activity for disease prevention and treatment.

iii. The primary goal of the parties shall be to advance the standing of health care providers within the territory assessing the physical activity levels of their patients and either providing an exercise "prescription" or a referral to a qualified health, fitness or allied health professional for further counseling (the "Goal").

iv. Licensee (the host institution) and ACSM support and intend through this Agreement to form a National Center ("NC") in the "Territory" of Germany.

v. Licensee agrees to apply for membership in the European Initiative Exercise in Medicine e. V. (EIEIM) and to fulfil all requirements of a member of the EIEIM as required by the statutes of EIEIM.

vi. EIEIM acts a Regional Center Council ("RCC") of the Exercise is Medicine® Global Health Initiative (Global EIM) and is the governing body of Global EIM in Europe, with territory as defined by the membership states of the Council of Europe and Israel.

vii. Global EIM, EIEIM and NC agree that they will respect the territory and their responsibilities at the global, regional and national level. With respect to this Agreement, they will not approach each other's' educational or industry partners, without written consent.

2. Existence of NC: Licensee shall be responsible for initially establishing the NC which shall be subject to the following requirements:

a) Establishment:

i. NC shall establish a NC Advisory Board (NCAB) that shall consist of at least 5 members unless exempted by ACSM pursuant to the recommendation of the EIM Global Center ("EIMGC").
ii. NCAB membership shall include at least one official representative drawn from each of the following stakeholder groups: (i) a national primary care physician organization; and, (ii) a national sports medicine and/or science organization (unless exempted by recommendation of EIMGC).
iii. NC shall contact the Ministry of Health or similar governmental agency with authority over health in the Territory and invite the agency to appoint a representative to membership on the NCAB.
iv. NC is highly encouraged to invite an academic representative for membership on the NCAB.
v. NCAB shall accept no more than one representative from a single organization, including the Licensee organization, for membership unless exempted by recommendation of EIMGC or EIEIM.
vi. This MOU will be co-signed by EIEIM, after being granted membership to EIEIM.
vii. NC cannot obtain a MOU without being a member and fulfill the membership duties in EIEIM.
viii. 1 (and only 1) official representative from each NC within the Territory will be an official representative for EIEIM with additional members according to the membership regulations.
ix. EIEIM can require proper identification of the legitimization of an NC.
x. NC invites EIEIM as observer to official meetings

b) Governance:

i. NCAB shall at minimum hold quarterly meetings, either in person or via teleconference, to advance the Goal within the Territory, set goals, strategies, and timelines, and achieve such goals, strategies and timelines, which shall be reviewed and updated on at least an annual basis.
ii. NCAB decisions shall be made by majority vote of a quorum of NCAB members necessary to take a vote.
iii. NC shall make good faith efforts to secure sufficient funding to hire a service provider ("NC Manager") to manage tasks assigned by and otherwise support the NC to further the advancement of the Goal within the territory.
iv. A guideline job description for the NC Manager may be provided by ACSM from time to time, subject to customization, as mutually agreed, by the NC, EIEIM and the EIMGC.

c) Licenses:

i. Licensee shall support NCAB by receiving and distributing funds related to the use of any marks licensed under this Agreement or advancement of the Goal within the Territory in accordance with and pursuant to the directives of the RCC & EIEIM
ii. Any sponsorship agreement being considered by EIEIM or NC that would be deemed competitive with that of an EIM Global Partner requires review and discussion with the EIM Global Center for consideration of potential implications to the respective EIM Global Partner.
iii. Sponsorship related to products in the following areas is strictly prohibited: firearms, tobacco, alcohol;
iv. NC understands and acknowledges that ACSM has contracted and maintains relationships with certain entities ("EIM Global Partners" – “GP”) that hold worldwide licensing and other rights that include the Territory as identified in the master list of GP that EIMGC, or its designee, maintains and has made available to NC (see Exhibit 2). Any use of trademarks licensed under this Agreement shall be subject to and in compliance with any GP, and Licensee shall include in all media, including without limitation electronic and print media, the logos of GP in the Territory unless otherwise exempted by EIMGC.

v. NC exposes global sponsors in all materials provided as global sponsors at the EIEIM activities. When global sponsors want to have broader representation in an event or for a purpose organized or developed by NC, EIEIM or member organizations, they agree on reasonable financial and management terms, which are appropriate for an event, or a purpose. Global sponsors cannot request to receive dedicated marketing efforts from local RCC or from EIEIM for free.

vi. For all third party sponsor contracts, Licensee shall apply as directed in such third party sponsor contract 100% of monies allocated to a specifically identified event or purpose. This is also applied for EIEIM and all other RCCs for additional sponsor contracts with a global sponsor for a specific event or a purpose. Licensee shall have the right to enter into contracts with third parties within the Territory and benefitting NC. Licensee shall have sole responsibility for all such contracts and shall hold harmless, defend and indemnify ACSM and EIEIM from any and all claims or harm that might result from or in any way are related to such contracts. Any third party contract that has a third party sponsorship component shall be subject to the following provisions and restrictions: Sponsorship related to products in the areas of firearms, tobacco, alcohol is strictly prohibited.

3. **Confidentiality, Non-Compete and Insurance:** Licensee and NC shall take all reasonable steps to ensure the confidentiality of this Agreement and any agreements entered into by ACSM and/or EIEIM and Licensee pursuant to the license granted in this Agreement.

4. **Indemnity for ACSM and EIEIM:** Licensee and NC shall indemnify and hold harmless ACSM and EIEIM, their affiliates and their respective officers, directors and employees from and against all costs, expenses, damages, claims, obligations and liabilities whatsoever from facts or circumstances not attributable to ACSM or EIEIM including, but not limited to, all costs arising out of the acts or defaults, whether negligent or not, of NC, NC's agents, sub-contractors and employees.

5. **License Terms:**
   a. ACSM owns the trademarks listed in Exhibit 1 ("Licensed Trademarks") together with the associated goodwill and related trademark registrations.
   b. ACSM uses, or intends to use or license use of, the Licensed Trademarks worldwide in association with goods and services identified in Exhibit 1 (the "Goods and Services") to advance the Goal.
   c. Subject to the terms and conditions of this Agreement, ACSM hereby grants to Licensee during the Term (defined below), and Licensee hereby accepts, a limited, terminable, sub-licensable, right and license to use the Licensed Trademarks in association with the Goods and Services in the Territory.
   d. ACSM shall be notified of proposed trademark agreements ("agreements") between NC and Sub-licensees and shall have the right to revise and question the agreements within a period of 30 days after notification. EIEIM should be notified about such agreements and can question the agreements within that period. If the proposed agreement is within the rules of this Agreement then new agreement shall become effective 30 days after notification.
   e. The term of this license shall be five years from the Effective Date.
   f. Licensee shall use the Licensed Trademarks only in association with the Goods and Services, and only in the form shown on Exhibit 1 hereto, unless otherwise directed in writing by ACSM. ACSM may from time to time provide EIEIM with versions of the Licensed Trademarks that have been modified to account for language differences or other convenience in the Territory. ACSM shall own and retain all rights in such modified Licensed Trademarks.
   g. In case of serious violations of this Agreement, ACSM and EIEIM shall have the right to terminate all licenses granted under this Agreement by providing written notice to Licensee. Serious violations include termination or insolvency of the NC, sponsorships in prohibited areas, sublicense agreements outside the Territory and apparent inactivity for more than 12 months. ACSM and EIEIM shall also, at their sole and absolute discretion, have the right to terminate all licenses granted under this Agreement without cause by providing written notice to Licensee if NC is failing to advance EIM within the Territory

because NC has departed from the EIM global vision, is failing to set satisfactory goals or is failing to execute stated goals that ACSM and EIEIM deem essential to success. For all material which is generated within ACSM, EIEIM or NC for non-profit use (e.g. scientific and public information), both parties agree that they can use that without charges. The legal regulations according to copyright and authorship are respected; underlying copyrights for material may exist and should be displayed.

h. Licensee shall be responsible for complying with any laws, rules, regulations or other requirements related to the legality and enforceability of this Agreement in the Territory by appropriate means. Licensee acknowledges that EIEIM has its own trademark (Display 3). Licensee and EIEIM shall retain sole global ownership of all materials which they provide to ACSM.

i. Both parties agree that the appropriate use of the license trademarks and Goods and Services by EIEIM or any other entity is the interest of both parties. Therefore, both parties agree to take reasonable actions to protect the trademarks, Goods and Services.

j. ACSM and EIEIM will support Licensee by appropriate means in efforts to enforce the Agreement and protect the trademarks within the Territory.

k. Both parties agree that the Goods and Services are subject to quality control requirements and that they will periodically discuss the desired outcomes related to these Goods and Services

l. Upon expiration or termination of this license, all rights and licenses granted to Licensee hereunder shall terminate. In the event this Agreement is terminated, Licensee will not continue to use Goods or Services owned by ACSM or to use the ACSM trademark. Licensee may continue to use Licensee owned Goods and Services with the ACSM trademark for a reasonable period in which Licensee will change the appearance of Licensee Goods and Services to bear only the Licensee trademarks. Concepts, ideas, and activities are exempt from regulations unless an activity has specifically been identified in Exhibit 1. The termination has to be agreed in an agreement of termination. In case of termination of this agreement, the existing rights of licensees are to be protected or transferred.

6. **Language:** This Agreement shall be executed in English.

7. **Writing Required:** The provisions of this Agreement may be changed only by a written agreement specifying such amendment, referring to this Agreement, and executed by duly authorized officers or representatives of the Parties.

8. **Survival of Provisions**: The provisions of this Agreement related to the Licensed Trademarks, quality control, obligations upon termination, modification, and survival, and any other provisions that by their nature should survive, shall survive the expiration, termination or cancellation of this Agreement.

9. **Governing Law**: This Agreement shall be governed by the laws of the United States of America and the site of dispute would be Indianapolis, IL, without resort to its conflict of law provisions.

The Parties hereto have caused this Agreement to be executed by their respective duly authorized representatives effective as of the Effective Date:

AMERICAN COLLEGE OF SPORTS MEDICINE, INC.

By:	_____	By:	_____
Print Name:	_____	Print Name:	_____
Title:	_____	Title:	_____
Date:	_____	Date:	_____

EUROPEAN INITIATIVE FOR EXERCISE IN MEDICINE e. V.

By:	_____	By:	_____
Print Name:	Jüergen M. Steinacker, Prof. Dr.	Print Name:	_____
Title:	Chairman	Title:	_____
Date:	_____	Date:	_____

NATIONALE INITIATIVE EXERCISE IS MEDICINE - COUNTRY

By:	_____	By:	_____
Print Name:	_____	Print Name:	_____
Title:	_____	Title:	_____
Date:	_____	Date:	_____

EXHIBIT 1

Licensed Trademarks	Goods and Services
1. EXERCISE IS MEDICINE	Promoting the concept that physical activity: (1) is integral to the prevention and treatment of disease and should be a standard part of the disease prevention and treatment medical paradigm; (2) should be regularly assessed as part of all medical care; and, (3) should be considered a vital sign by all health care providers for patients to be effectively counseled by their physician, including referral to a qualified health and fitness or allied health professional for further counseling Digital materials, namely, downloadable electronic publications in the nature of reports, charts, flyers, brochures, informational sheets and guides in the field of physical activity, health promotion and wellness. Printed materials in the nature of reports, surveys, charts, pamphlets, flyers, brochures, leaflets, informational cards, informational sheets, guides and folders in the field of physical activity, health promotion and wellness. Educational services, namely, conducting conferences and seminars in the field of physical activity, health promotion and wellness, and distribution of course material in connection therewith; providing on-line publications in the nature of reports, surveys, charts, pamphlets, flyers, brochures, leaflets, informational cards, informational sheets, guides and folders in the field of physical activity, health promotion and wellness. Promoting public awareness of physical activity, health, and wellness, and the importance of health service providers in maintaining and improving health and wellness.
2. Your Prescription for Health ExeRxcise is Medicine®	
3. EUROPEAN INITIATIVE FOR EXERCISE IN MEDICINE REBRANDING MEDICAL COUNSELING FOR HEALTH Your Prescription for Health ExeRxcise is Medicine®	

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REVIEW ARTICLE

Prevention and Management of Non-Communicable Disease: The IOC Consensus Statement, Lausanne 2013

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Abstract Morbidity and mortality from preventable, non-communicable chronic disease (NCD) threatens the health of our populations and our economies. The accumulation of vast amounts of scientific knowledge has done little to change this. New and innovative thinking is essential to foster new creative approaches that leverage and integrate evidence through the support of big data, technology, and design thinking. The purpose of this paper is to summarize the results of a consensus meeting on NCD prevention sponsored by the International Olympic Committee (IOC) in April, 2013. Within the context of advocacy for multi-faceted systems change, the IOC's focus is to create solutions that gain traction within health care systems. The group of participants attending the meeting achieved consensus on a strategy for the prevention and management of chronic disease that includes the following:

1. Focus on behavioural change as the core component of all clinical programs for the prevention and management of chronic disease.
2. Establish actual centres to design, implement, study, and improve preventive programs for chronic disease.
3. Use human-centered design in the creation of prevention programs with an inclination to action, rapid prototyping and multiple iterations.
4. Extend the knowledge and skills of Sports and Exercise Medicine (SEM) professionals to build new

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programs for the prevention and treatment of chronic disease focused on physical activity, diet and lifestyle.
5. Mobilize resources and leverage networks to scale and distribute programs of prevention.

True innovation lies in the ability to align thinking around these core strategies to ensure successful implementation of NCD prevention and management programs within health care. The IOC and SEM community are in an ideal position to lead this disruptive change. The outcome of the consensus meeting was the creation of the IOC Non-Communicable Diseases ad-hoc Working Group charged with the responsibility of moving this agenda forward.

1 Introduction

Non-communicable diseases (NCD, Table 1) account for 60 % of all deaths and 44 % of premature deaths [1, 2]. NCD are now the greatest cause of morbidity and mortality even in developing countries where they account for twice as many deaths as HIV/AIDS, tuberculosis, malaria, and all other infectious diseases combined [1–3]. They are a barrier to achieving the UN's Millennium Development Goals [4] and are a global threat to our economies in addition to our health. A report by the World Economic Forum and Harvard University estimates that chronic disease, currently costing 2 % of the global Gross Domestic Product (GDP), will cost the global economy 30 trillion $US over the next two decades, cumulatively 48 % of the global GDP in 2010 [3]. But, chronic diseases are largely preventable. Their main causes are related to lifestyle, i.e. physical inactivity (recently labeled by The Lancet as being pandemic [5]), an unhealthy diet, and tobacco and alcohol abuse.

In 2010, the World Health Organization (WHO) and the International Olympic Committee (IOC) signed a memorandum of understanding to jointly promote activities and policy choices designed to reduce the risk of NCD [6]. This was followed by a landmark speech given by the IOC President to the plenary session of the Sixty-Sixth General Assembly of the United Nations, September 19, 2011; a "watershed event" to "replace ignorance and inertia with awareness and right actions" [7]. IOC President Dr. Jacques Rogge told the Assembly: "The problem is acute, the solution is at hand. It is a grim picture, except for one thing: We can do something about it."

Low cost, highly effective solutions for the prevention and management of NCD are available [5]. The IOC President emphasized the WHO recommendations on physical activity as central to NCD prevention [6]. He called for safe and accessible public spaces for physical activity and sport, partnerships with transportation and urban planning, increased physical education and better sport infrastructure and organization, thus building on the comprehensive, broad-based, long-term approaches recommended by the International Society for Physical Activity and Health (ISPAH), the Grand Challenges Global Partnership, the WHO, the European Commission (EC),

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R. Weiler
University College London Hospitals NHS Foundation Trust, London, UK

Table 1 List of non-communicable diseases

Cardiovascular disease
Diabetes
Cancer
Chronic respiratory disease
Hypertension
Dyslipidemia
Obesity
Metabolic syndrome
Arthritis
Osteopenia/osteoporosis
Degenerative disc disease
Depression
Sarcopenia and frailty
Cognitive impairment
Cerebrovascular disease
Neurodegenerative disease
Rheumatoid arthritis

the World Economic Forum (WEF), Active Canada, Exercise is Medicine™, the Organization for Economic Cooperation and Development (OECD) [1–3, 8–13], and many others.

To date, efforts to promote a "home" for prevention within health care have largely failed. Waiting for comprehensive, emergent reform of dysfunctional health care systems is unrealistic. Likewise, results from reductionist research studies have not been successfully implemented and scaled in such a way as to create population-wide impact.

The current approaches to chronic disease prevention and management involving public health and global health strategy [14] may need to be merged with human-centered design (HCD). The latter approach, used as a catalyst for change in other industries, focuses on the importance of the human element in behavioural change [7]. Successful implementation of testable, novel approaches will require committed, visionary leadership willing to reframe the problem from a practical, human-design perspective while sticking to a clear strategy to mobilize the resources and capacities needed for change.

The objective of this IOC consensus meeting was to achieve alignment on a strategy to design a sustainable plan of action for the prevention and management of NCD, coupling existing scientific evidence with HCD, focusing particularly on physical activity/exercise and behavioural change. In order to accomplish this objective, the sport and exercise medicine (SEM) community must overcome considerable inertia created by the complexity and magnitude of the NCD problem and its context. The SEM community must bundle its efforts and embrace a new, creative approach aligned with a strategy that is clear, concrete, and human-centered.

2 The Problem

For most of human history, people needed to be physically active to survive. Today, for instance, only 20 % of Norwegian [15], 8.2 % of US [16], and 5 % of UK [17] adults meet physical activity guidelines. Over a four-decade period, physical activity in the US has declined 32 % and the reduction is projected to decline even further to 46 % by 2030 [18], while from 1991 to 2009, China's physical activity rates dropped by 45 % [18]. In the Arab World, eight countries have physical inactivity levels ranging from 33 to 70 % of the population [19]. Over the past 50 years there has been a marked decline in energy expenditure for household management [20] and civilian occupation [21], sufficient to explain the rising prevalence of obesity [22]. Worldwide, physical inactivity and smoking are responsible for more deaths than any other modifiable risk factors [5]. Clinical scientists are continuing to identify more characteristics that magnify the problem. For example, sitting time has been shown to be associated with increased cardio-metabolic risk independent of levels of physical activity [23–25]. Low aerobic fitness is a risk factor for all-cause mortality, cancer and cardiovascular disease, independent of body fatness [26, 27].

While the problem of physical inactivity, poor diet and unhealthy lifestyle behaviours is evident and clear, the *real* problem is that we have not been able to mitigate the steady rise in NCD. In fact, the morbidity and mortality from NCD has worsened during the time we have been accumulating research data and publishing position statements and recommendations [28]. The mere existence of national physical activity policies or action plans does not ensure their functionality or implementation. Physical activity guidelines are not implementation and implementation does not guarantee change [29]. We can no longer opine that governments, schools, employers, facility managers, urban planners, ministries of education, global organizations, health care professionals, universities, recreation and health departments, community organizations, sport federations, the health care system, and transportation departments, "should" *do* something [8]. The SEM community can *do* something, because its expertise lies closest to the intersection of physical activity, diet, and health.

Despite global advocacy for a sound "whole of government" systems approach [30], the direct and indirect costs of NCD remain staggering and unsustainable due to the financial, political and structural complexity involved. The health care industry pushes government agencies for policies leading to change and the government pushes the

health care industry to develop programs of prevention. The failed attempt to limit the serving size of sugar-sweetened beverages by Mayor Bloomberg in New York City is an example of the limits of authority even with well-intended policy interventions [31]. In contrast, the Director of the Swedish Bureau of National Health and Welfare declared there is enough evidence [32, 33] for the health care system to act "now", an example of the government's expectation that real change requires the *medical system* to act. Prevention remains caught in the middle with policy makers telling health care to implement change and vice versa. With broad and ill-defined objectives that lack alignment and strategic focus, prevention remains in the realm of passive and suggestive theory and the vast amount of scientific evidence while true, has been useless for effecting change [34]. Not surprisingly, there is no clear plan to respond. We readily acknowledge the conflict between the complexity of chronic disease and the reductionist approach being used to solve it as well as the potential blind spots that result from determinist thinking [35, 36]. The complex non-linearity of health behaviour does not allow for simplification by solely focusing on a single intervention. We must resist, on the one hand, lofty position statements and recommendations that lack concreteness and clarity and that displace responsibility to amorphous entities and on the other hand, a top-down approach conceived by medical and scientific experts that reproduce knowledge and guidelines that does not translate into action.

We must figure out how to get around the obstacles that prevent us from making progress in prevention. These include: (1) the reductionist, determinist approach to thinking within medical science which has become the default approach to health care delivery, (2) the financial model of disease- and event-based medicine, (3) the single intervention model, (4) the lack of disease-burden matched and prevention-oriented curricula for training health care professionals, (5) the absence of a tailored distribution channel to deliver knowledge, and (6) the uncertainty of changing human behaviour [37].

3 Methods

In order to create a consensus action plan for the prevention and management of chronic disease, the IOC convened a group of experts April 10–12, 2013 in Lausanne representing SEM, public health, clinical epidemiology, design thinking, industry leadership, advocacy, exercise science, reliability and reproducibility of biomedical evidence, social marketing, education, technology, and lifestyle behaviour interventions. Prior to this, five participants met for one day in New York in December, 2012 to plan a design thinking approach to the meeting.

The 2½ day meeting opened with an introduction and statement of the problem followed by 15 minute lectures and discussion by each participant, addressing the following three questions: (1) Why did you accept the invitation to this meeting (why are you here)?, (2) What do you believe is the single most important thing that needs to happen (actually take place) to reduce the morbidity and mortality associated with chronic disease?, and (3) What steps would you take to implement that "thing" in the next one year? Experts were urged to use existing systematic collections of evidence as well as point to new areas of opportunity.

These presentations and discussions led the group to formulate the following issues for consideration: (1) the problem, (2) opportunities for behavioural change, (3) the importance of HCD, (4) the value of the SEM model of function and performance, (5) the requirement for actual centres within which to develop prevention programs, and (6) the importance of the IOC's leadership. Half the meeting time was spent using a design thinking approach to integrate scientific evidence with human reality to achieve consensus for an action plan. The last half-day was spent formulating a rough draft of the manuscript and an 18-month action agenda.

4 Behavioural Change

Given the impact of unhealthy lifestyles on the chronic disease pandemic [5, 16, 29] governments began, decades ago, to emphasize lifestyle and behaviour changes to broaden the scope of national health policies beyond traditional medical and surgical interventions [38–40]. For this reason, a primary focus on behavioural change as the core component of all clinical programs for the prevention and management of chronic disease is essential.

Understanding and guiding human behaviour is very complex given the wide range and overlapping correlation of individual (beliefs and attitudes), interpersonal (cultural and social norms), environmental (social, built and natural environment) and policy (regional, national and global) factors [16]. In a Swedish study, 76 % of patients recognized responsibility for changing their own behaviour but still expected the health care system to help them change [41]. This complexity reflects the underlying discussion as to personal or social "responsibility" for physical inactivity and other lifestyle "choices".

The emphasis of interventions can be on proximal (individual) or more distal (social–cultural and/or environmental–political) correlates of physical inactivity and other lifestyle related behaviours. There is good reason to believe the proper emphasis is changing the environment by engineering physical activity into our daily lives without

individual awareness. Insights such as the so called "nudges" encourage and support people through change toward a choice architecture that alters their behaviour in a predictable way, whilst fully preserving their autonomy and respecting cultural norms. In simple terms, nudging can be used to change the default option towards a healthier choice [42, 43], for example by placing healthier products at a more prominent and convenient place in the cafeteria. However, altering choice architecture through advocating for concurrent, system-wide strategies to build a supportive environment requires huge efforts to orchestrate multiple stakeholders including policy makers, non-governmental organizations (NGOs), schools and corporations to bring about desired changes.

Various social cognitive theories that solely emphasize the intention of self-regulation and self-control as key determinants of behaviour, eg. Theory of Reasoned Action [44] and Theory of Planned Behaviour [45] fall short when taking into account the importance of the habit formation process [46] and the contextual nature of behaviour [47]. Traditional interventions assume that people make rational lifestyle decisions whereas, in reality, many such decisions are actually irrational, using unreasoned shortcuts or heuristics (habits) instead of logic [48]. Thus, most interventions, which are designed solely from a content perspective without acknowledging the user as the expert of their own experience, are more likely to fail. Interventions and solutions need to "go with the grain of how people behave" [49].

The power of habit formation in behaviour counseling remains relatively untapped for NCD prevention. Habits are automatic responses to contextual cues, acquired through repetition of behaviour in the presence of these cues [50]. In order to change these habits one needs to take into account that a specific cue will trigger action if motivation and ability to perform the task are adequate to result in a physical or psychological reward [51]. For example, even if an unfit person becomes highly motivated to run a marathon tomorrow, he or she will most likely not succeed since the physical ability (e.g. cardiovascular capacity and muscular endurance) needs to be developed over time. Thus, the difficulty of the task needs to be lowered and thereby the ability to perform increased. Habit formation starts with simple, very specific tasks of daily physical activity that can be gradually increased as one builds confidence and control (e.g. taking the stairs instead of the elevator at work). With incremental success and the adoption of more ambitious behaviours, a more tractable and specific behaviour change is targeted rather than a complex task such as "running a marathon". Upon successful formation of one specific healthy habit in isolation, there may be a spill-over effect to many other aspects of the individual's life [52, 53]. Additionally, targeting one person with a behaviour change program may impact his or her social network by triggering substantial behaviour change in that person's friends, thereby shaping a social norm [52]. Thus, the cumulative impact of a preventive intervention is the sum of the direct health outcome of the individual, plus the collateral health outcomes in those socially connected (collateral health effects). This emphasizes the connection between the individual and surrounding social determinants of health [54]. Of course, collateral effects can be both positive and negative, and therefore both possibilities should be considered.

A large opportunity is appearing related to the conversion of data into information that helps guide sound decisions by both clinicians and patients. Tools like patient activation measures help to stratify and individualize patient care by tailoring coaching, education, prevention, and care protocols to different patients at different levels of readiness [55]. Technological advances are readily available, such as pedometers or tracking devices, that may include sensors in smartphones, to provide important information about individual physical activity patterns [56]. Persuasive technology uses interactive smartphone applications as a decision support tool to trigger certain user behaviours through instant feedback and support [51]. By incorporating the feedback from real-time patient data analysis, it is possible to provide insights in the choice architecture towards much more targeted behaviour counseling [51].

The explosion of big data produced by the digital society has caused a management revolution in other industries in decision-making and customer engagement [57, 58]. Companies worldwide invest heavily in sophisticated analytical capabilities aiming to draw meaningful customer insights [56]. For example, traditional retailers analyze buying habits of their customers and run algorithms to better predict their needs and customize their product suggestions based on unique preferences of the individual [59]. In Public Health, Google is able to predict the spread of an influenza pandemic more accurately and several weeks earlier than the traditional surveillance systems of the US Centers for Disease Control (CDC) [60]. Comprehensive data analytics have long been used in sports such as baseball and soccer to determine success factors and adjust the tactics accordingly [61]. In health care, Electronic Medical Records (EMR) generate massive data sets, offering the challenge of how to convert largely unstructured by-products of health care delivery into useful assets for patients' insight [62]. These technology advances will leverage insights, foster behavioural change and ultimately lead to habit formation by influencing the individual, interpersonal or environmental factors, a necessity for a successful prevention plan.

5 Human-Centered Design

In preventive health care we too often jump from our knowledge of a situation to "learned solutions", bypassing critically important steps including observing, discovering, interpreting, ideating, prototyping, iterating and monitoring. This works for many of our daily tasks (e.g. prescribing beta-blockers for high blood pressure) but reaches its limits with lifestyle change. For example, we don't always know how to translate precise, well-established guidelines and recommendations into an individual's daily routine [63]. Nor do we educate healthcare providers with the knowledge and skills to deliver well-established and evidence based interventions to our patients [64]. From a scientific, analytical perspective we know the dose-response relationship of regular exercise with regard to frequency, duration and intensity [65]. In fact, every health care professional and layperson knows more or less about the importance of physical activity to well-being and quality of life. Still, the compliance rate with evidence-based guidelines is poor and inconsistent, from the provider and the patient perspective [63, 66].

Interventions designed from a content perspective that only see the user as the beneficiary of the final product or service often fail because, by directing people using a top-down approach, impediments for implementation and adherence at the individual and organizational level are not taken into account [67]. Patients are often given solutions that only focus on the treatment of their diseases instead of solutions that also incorporate aspects of *desirability* (Fig. 1). For example, prescribing a medication is one treatment option for many diseases, however, without a behavioural plan for habit formation, compliance may impede the success of this treatment option. When designing prevention programs, framing the context for behavioural change requires asking the right question, which is often "what matters most to you" rather than "what's the matter". The lack of active human engagement in understanding patients' underlying problems and developing feasible solutions may explain why, after decades of tool development, we haven't achieved results with prevention.

Yet "providing care that is respectful of and responsive to individual patient preferences, needs, and values and ensuring that patient values guide all clinical decisions" [68] has long been identified as a key quality improvement parameter towards patient-centered care [69–71]. Indeed, HCD has become an essential component within industry by providing tools to understand people's needs and motivations in order to design desirable, feasible, quality solutions that meet those needs [72–74].

Prevention differs from treatment from a behavioural perspective because future health problems are "invisible" (subclinical, asymptomatic) [75], resulting from deeply ingrained habits. With prevention, "success" is defined as the absence of an outcome (e.g. avoidance of a heart attack). Thus, empathic solutions become critically important in prevention. The challenge for health care, one that has not yet been embraced, is to accept responsibility for understanding the factors that direct behavioural change within this context. HCD embraces constraints to innovate solutions from the human perspective (Fig. 1) and combines empathy, creativity, and rationality in analyzing and fitting solutions to context and personal preferences. HCD uses techniques and methodologies to understand the complex context of internal motivators and external barriers to behavioural change and habit formation. Direct observation and interaction with people are used to understand the context of what they want and need in their lives and what they like or dislike about the way particular products or services are made and delivered (Fig. 1) [72]. By investigating—and designing for—the human element it is possible to gain unexpected insights on how to frame

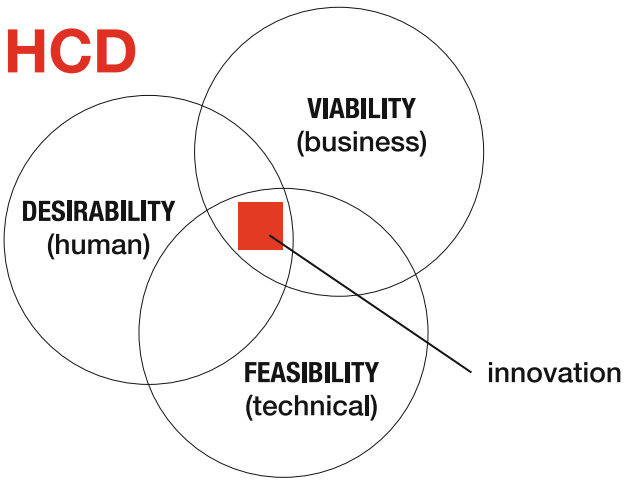

Fig. 1 Human-centred design (HCD) [72]. HCD is a methodology for innovation that requires engaging people in order to understand their preferences. With innovation, there are three overlapping constraints. *Feasibility* is what is functionally or technically possible within the foreseeable future. *Viability* is the likelihood the innovation will become part of a sustainable business model. *Desirability* refers to what makes sense to people and for people (important human factors). These constraints inspire innovation and an HCD approach will bring them into harmonious balance. Willing and even enthusiastic acceptance of competing constraints is the foundation of HCD. The design thinking process involves: (i) *Understanding*—challenging the status quo (too often we jump from ideas to solutions without understanding underlying motivators and drivers), (ii) observation—gaining insights through on-site observations, (iii) synthesis—framing and grouping insights to identify problems and opportunities using visual techniques—it is critical to find the right question to ask because the way a problem is framed often identifies the approach to innovation, (iv) ideate—various approaches are used for innovation, and (v) prototype—rapid prototyping allows quick feedback for iterations

the problem from the individual's perspective in a way that can help to develop the sustainable solutions.

A design attitude toward problem solving allows us to ask basic, but fundamental questions like "what is the real problem being faced and how might we overcome it?" [76]. The initial solutions are created with human desirability in mind and focus later on the technical feasibility and viability of possible solutions [77]. For example, an increased attention to age appropriateness, fun, incentives and motivation, social support, feedback and style of teaching/coaching/mentoring in interventions targeting children can be substantial to the experience and feeling of the intervention [78]. HCD is an approach that can incorporate other methodologies such as Intervention Mapping [79, 80] and that compensates for the deficiencies that require "implementation research" [81, 82]. With these categories in hand, designing a simple and easily understandable program (more user-centric) avoids the confusion which often takes place at the end of program development when it's discovered that compliance with the intervention is low.

There is an immense opportunity arising as health care professionals show increased interest in focusing on user-centricity and acknowledge that designers can have a profound influence on social innovation [83]. The critical balance of creative and intuitive thinking (design thinking) with technical and content expertise (analytical thinking) has been very successful in diverse settings and organizations [72, 74]. Human-centered design with its inclination to action, rapid prototyping and multiple iterations can be piloted, scaled, and formally tested for its ability to create effective preventive programs for chronic disease.

6 Unique Attributes of Sport and Exercise Medicine for Disease Prevention

The modern medical discipline of SEM has its roots deeply imbedded in the scientific study of human *function* and the *beneficial adaptations* to physical activity and exercise that accrue in multiple organ systems. The human body has profound capacity to increase performance in response to training. Increases in muscle mass, stroke volume and ejection fraction, red blood cell mass, capillary density, mitochondrial volume density as well as changes in fuel storage and utilization result in improvements in muscle strength, endurance, aerobic and anaerobic capacity as well as agility, balance, and flexibility. These adaptations are profound. The term *performance* tends to be used to describe these adaptations in the competitive athlete while *functional capacity* is most often used for non-athletes. For an aged person or one with chronic disease and multiple co-morbidities, functional capacity remains trainable in the same way performance is trainable in athletes [84]. The training that results in these physiologic adaptations is the same training associated with substantial health benefits.

Despite this rather noble foundation for SEM, a clinical discipline less than four decades old, its potential to benefit health and function outside of competitive athletes has not been realized. For this reason, it is necessary to extend the knowledge and skills of SEM to the general population to build new programs for the prevention and management of chronic disease focused on physical activity, diet and other lifestyle components.

Virtually everyone develops chronic disease and most people develop multiple chronic diseases. For this reason, creating a culture of health versus disease is not realistic. The much more realistic approach is acknowledging the reality of chronic disease and working to prevent and manage it over the lifespan. Symptoms of chronic disease are simply events along a continuum that spans many years during which preventive practices may influence the onset and severity of the symptoms. Traditional medicine sees the absence of symptoms as health and the onset of disease symptoms as an acute event requiring treatment (e.g. medication or surgery). Prevention attempts to identify risk factors early, address these factors and thereby delay the onset of symptoms of chronic disease. Furthermore, prevention can ameliorate the effects of existing chronic disease on functional capacity and the development of related chronic diseases (co-morbidities).

There is an urgent challenge as to how to successfully include the prevention and management of chronic disease in the daily clinical practice of SEM and primary care medicine [37]. The challenge is one of *addition*—developing *new* capacity, clinical programs and expertise in chronic disease prevention and management to provide *new* preventive services to the general public in an effective and cost-effective way [85]. The focus of most SEM practitioners and clinics is still on the care of competitive athletes. One of the unique features of the scope of SEM is that, unlike other medical specialties, it is not organ system or disease specific [86]. To date, knowledge and clinical skills in the area of chronic disease prevention and management have not been the focus of continuing professional development in SEM even though this would be a relatively simple and potentially influential step to take. Formal clinical training in chronic disease prevention and management must be developed and provided for SEM and primary care practitioners that includes role identification, communication and integration between health care providers and the fitness and wellness industry.

7 Creating Actual Programs and Centres for Disease Prevention

Right now, there is no "home" for prevention within health care. There are no community-based prevention centres

that can be directly accessed by anyone seeking to maintain or improve their health. Despite some existing rehabilitation facilities and lifestyle units in primary care, there are no programs of population-wide scale that focus on behavioural change with regards to physical activity, exercise or other lifestyle options. This vacuum is being filled by weight loss centres, fitness and wellness studios; a multi-billion dollar industry founded on principles that differ from those that underpin the health care industry. This results in a low level of interaction and coordination since the health care system tends to view these industries as lacking the "credibility" and "authenticity" to partner on prevention. To establish actual centres to design, implement, study, and improve preventive programs for chronic disease, the value provided by evidence-based medicine needs to be combined with the value provided by the fitness, wellness, and weight-loss industries with their action-oriented approach and wide distribution network.

The creation of a sustainable foundation for prevention requires actual, physical centres (Fig. 2). Initially, these could be pilot centres that meet robust criteria for the integration of evidence with human-centered design, the use of technology and the inclination to action and rapid prototyping. Several of these centers, with meaningful collaborations with health care, academia, industry and technology can serve as development sites. While there are a number of excellent, well-conducted studies of behavioural change using sound conceptual models, the current clinical approach tends to be an intuitive, trial-and-error process mostly relying on the experience and skills of individual practitioners and health coaches. The first centres would provide the structure for an ideal prevention program by fostering the seedbeds of behavioural design through understanding, observing, synthesizing, ideating, prototyping and iterating. The factor that determines success will be, first and foremost, the ability to meet the human needs that are currently "hidden behind" what is often viewed as more important (quantitative measurements of disease status) (Fig. 1). By *starting* with empathy and human desirability, the experience factors of the programs are built around the "job-to-be-done" for the individual behind the disease. Thus, an initial screening needs to include cognitive and behavioural assessments along with the traditional functional assessment.

The traditional grouping into primary, secondary and tertiary prevention holds value for health care providers, medical scientists and program development strategists concerned with population stratification, safety, programming, logistics and outcomes. However, categorizations such as these have little relevance to individuals entering a prevention program since they are remnants of reductionist thinking related to the presence or absence of disease or risk factors. Organizing programs around such categories falls short of acknowledging, amongst other things, the human elements that transcend the medical-biological origin of those prevention categories: namely personal interests, personality traits, temperament, skills and abilities. By thinking in disease categories, any prevention program subordinates its process and function to the stage and progression of a certain disease.

Likewise, it can be confusing if not overwhelming to determine what constitutes prevention vs. management of chronic disease. It is clear that prevention applies to those without disease or risk factors and management applies to those with chronic disease. But, this distinction is arbitrary and prevention, as an umbrella term, applies to behavioural change with or without the presence or absence of disease or risk factors. What matters most to people is that the program is desirable. That is the starting point.

In addressing the real needs of people, it is essential to identify certain persona profiles and characteristics of particular population groups. This helps to move from purely labeling people based on manifestations of disease toward valuing their needs and goals, which is the heart of prevention. Ninety percent of health care spending is for sicker patients with 80 % of health care spending traced to patients with largely predictable health care needs and expenses: the chronically ill [87]. This bloated number is a mirror of our structures in medicine which are heavily tilted toward "fixing" disease. While tertiary prevention (management) might provide immediate gains from a cost-benefit perspective, we must avoid the rigidity of categorization of prevention into primary, secondary and tertiary since this focuses the scope of service, yet again, on the reductionist model of type and stage of disease. Clinical, comprehensive lifestyle intervention programs bear substantial similarity with respect to the fundamental principles of behavioural design regardless of how a person is "labeled" or what category they are assigned. Any clinical program failing to recognize this by focusing on one prevention category only would fall short of creating true population-wide impact. For this reason we need to move from abstract concepts of prevention to concrete, relevant programs for groups of people, reflected in different personas, clustered according to their functional, behavioural and cognitive status. This approach, using factors that characterize human desirability for clustering and stratification is a key differentiation factor for the success of prevention programs. Alignment on this is absolutely essential.

The fundamental components of a prevention program include assessment (medical, cognitive, functional capacity, behaviour), program design and implementation, and monitoring and re-assessment (Fig. 2a). Individual components of the program must be based on evidence and current guidelines and delivered by trained health care

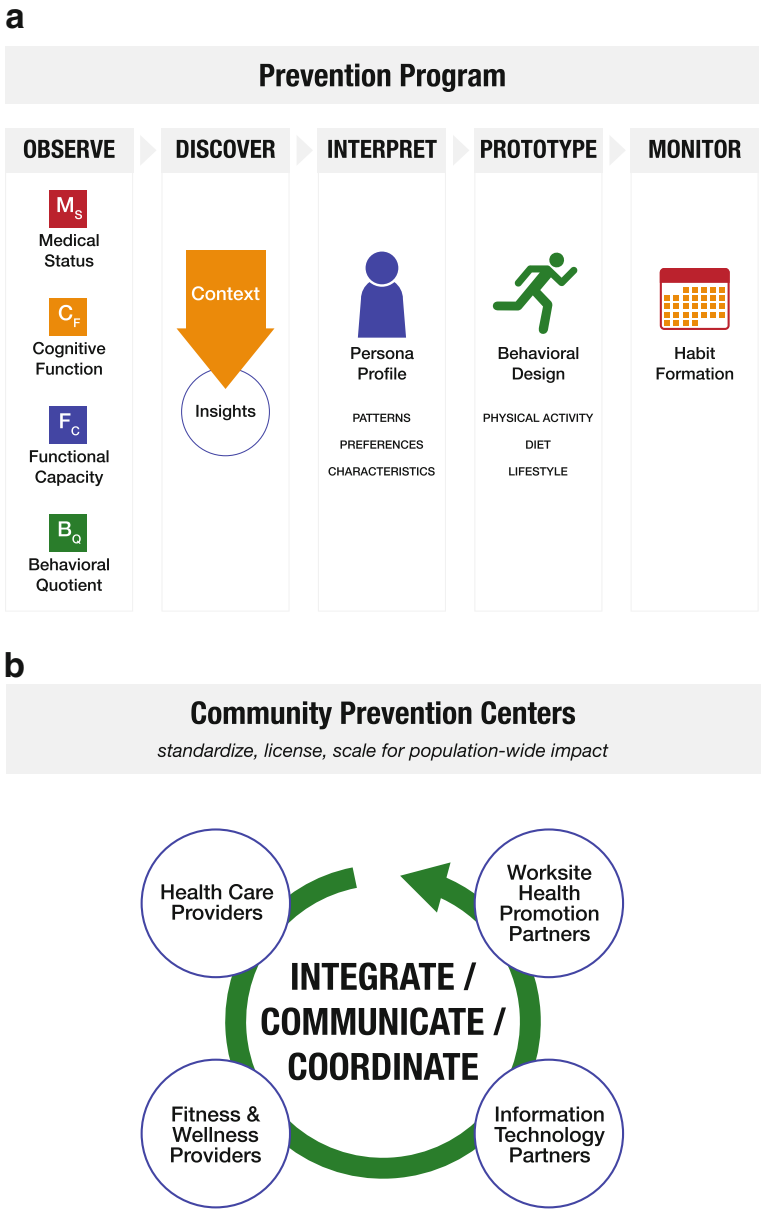

Fig. 2 Community Prevention Centres (CPCs). CPCs are actual facilities where scientific evidence-based medicine and human-centered design (HCD) are combined to develop and implement prevention programs. While much of the interdisciplinary interaction remains to be precisely defined, the road map shown integrates the HCD approach with the traditional method of program development. **a** In the initial observation phase of the prevention program, the medical status (M_S) of each client is assessed as well cognitive function (C_F), functional capacity (F_C), and behavioural quotient (B_Q). This input assists the health care professional in observing and understanding the context of the individual's current situation and generates insights regarding possibilities for behavioural change. Interpreting and synthesizing these insights and contexts enables the development of archetypal personas that can be used to classify client services based on key characteristics that relate to the likelihood of success for certain interventions. Based upon the experience and history with certain persona profiles, the health care professional can engage the client in an ideation process to target healthier behavior. Single, achievable tasks that result in behavioural change are used as prototypes for iterations that build confidence and control. The evolving loop of habit formation is dynamic and non-linear. Monitoring by e-Health tools includes measurement of outcomes in addition to reassessment. **b** CPCs integrate, communicate and coordinate client experience within an ecosystem that includes health care providers, fitness and wellness providers, worksite health promotion partners, and information technology partners. This communication, coordination and integration is critically important to bridge CPCs with existing structures in order to provide the client with an integrated service. Close medical follow-up and communication is especially important for chronically ill patients. The ideal setting for initial development and testing of these programs is in dedicated research centers that meet robust criteria for collaboration and feasibility. The specifics of such programs will shape over time with the help of data analytics such that the initially intuitive process will become a more standardized, precise way of behavioural change design. By achieving that, the program will become more affordable and it will be possible to achieve scale through, for example, licensing agreements to other health care providers or fitness facilities

professionals with experience and expertise. Much of this remains to be developed. Functional capacity includes all the factors that correlate with the physical ability to perform a given task. Behavioral quotient is a set of attributes that indicate motivation such as the readiness for change [88]. Cognitive function refers to information processing and learning. These four sets of factors shape the structure of a prevention program. In aggregation these variables and attributes contribute to a set of differing persona profiles. Upon taking into account the different preferences from various perspectives of personal development, programs can be much better designed to fit personal needs. Thus, using factors that characterize human desirability for clustering and stratification is a key differentiation factor for the success of prevention programs (Fig. 2a).

Based upon these assessment results and persona profiles, a program can be designed and customized to meet the individual's goals. Multiple options for health-related data exist (e.g. EMR, physical activity tracking devices, purchase histories, social media profiles), that can help in stratifying at the population level and later at the individual level to support rational decision making [48]. The ever-growing patient throughput in pilot programs of prevention will generate a large database and hands-on experience that can help to identify patterns at the population level allowing prediction in probabilistic terms of what works for whom under which circumstances. This would formalize the currently intuitive, informal process of providing behavioural change advice by health care professionals and move prevention toward a precise and personalized approach of mass customization. As a result, standardized yet individualized programs of high quality and low cost could be scaled at the population level.

8 Growing and Scaling Prevention Programs and Centres

At the core of the development of prevention and programs and centres is the creation of value for patients and caregivers through human-centred design (*desirability*, Fig. 1). Likewise, a sound business model is necessary in order to scale programs and generate population-wide impact (*viability*, Fig. 1). A strong partnership between the global SEM and primary care communities, sport federations and National Olympic Committees (NOCs) can mobilize resources and leverage networks to scale and distribute prevention programs (*feasibility*, Fig. 1). Working within these three constraints; desirability, viability and feasibility provides the greatest chance for innovation in prevention.

Progress in chronic disease prevention and management will require exceptionally strong leadership, a willingness to be disruptive [89] and a focus on rapid innovation. Success will require a deliberate, systematic approach with strategy clearly and continuously mapped to mission and vision, and resources developed to create capacity.

Sport and exercise have an important role to play in the prevention and management of non-communicable diseases [85, 90] and the IOC is the natural leader in this area [91]. Both the International Federations and the National Olympic Committees can play an integral role in promoting physical activity through sport by partnering with the IOC, WHO, International Physical Activity Networks, SEM associations and NGOs [92]. Many countries now focus on leaving a legacy of improving the health of the population by increasing physical activity as part of hosting major sporting events such as the Olympic and Paralympic Games [93, 94].

The IOC has already demonstrated its leadership capability in the establishment of programs such as Sport for All [95], Olympic Day Celebrations [96, 97], IOC Medical Commission initiatives such as health and fitness for young people through physical activity and sports [98] and education programs [99–101], the Youth Olympic Games [102], and through its collaboration with the WHO [6] and the UN [7]. The Olympic Games and the Olympic brand itself are based on positive universal values, which give it a powerful, emotive and unique identity that transcends sport and resonates strongly with people of all ages and cultures from around the world [103]. Olympic athletes inspire people to be the best they can in their everyday lives. Corporate partnerships build on this inspiration in cause-related marketing campaigns, which helps companies build socially responsible images and brand affinity within their customer base, translating into higher brand memorability, preference, and purchasing.

These partners are in a mutually beneficial, synergetic relationship with the IOC, which operates as a non-profit organization. There is a great opportunity to promote an IOC accredited prevention program through an alliance with well-known and respected corporate partners and medical societies and academic groups in order to penetrate and persuade a massive customer base [104]. The facilities and distribution channels already exist through the SEM and primary care networks. Upon developing successful and cost-effective prevention programs with adapted but stable financial models, these programs can be scaled internationally to lead to widespread change toward prevention.

The IOC, as a governing body, will continue its shared commitment and partnership with the SEM community by initiating and sustaining its effort toward the prevention of chronic disease, using a framework for change of the type described by Kotter (Table 2) [105, 106]. Some of the IOC's activities will include new and innovative methods like design thinking, which will require autonomy and

Table 2 Kotter's 8-step change model for leadership (modified from Kotter [106], with permission)

1. Establish a sense of urgency
2. Create a guiding coalition
3. Develop a vision for change
4. Communicate the vision for buy-in
5. Empower broad-based action
6. Generate short-term wins
7. Never let up—build on the change
8. Incorporate changes into the culture

appropriate opportunity for creative work, while others will foster collaboration, diversity and integration, maintaining the respect for traditions.

While it remains essential for the IOC, given its political influence, to advocate for a multifaceted approach [1–3, 8, 11] and to collaborate with policy makers, NGOs, schools, and corporations [107, 108], it is critical for the IOC to focus on one goal in the present to prevent the overwhelming paralysis that occurs when trying to simultaneously balance all public health issues at once. What is true for the individual, applies to organizations as well: "you can eat an elephant, but only one bite at a time". The IOC will work with the SEM community on the primary goal of designing clinical lifestyle intervention tools for health care professionals to adequately direct and assist patients in behaviour change. Given the talent, knowledge and resources within the IOC and the vested interest of the SEM community, the influence of this partnership, focused on the individual, has the potential to be immense.

The creation of prevention centres permits the leadership to pursue one clear strategy, a simple, immediate, and amenable method of influence from within health care that will have population wide impact. These centres will incorporate evidence with the systematic application of design thinking alongside current health promotion principles. In order to gain support and bring to life ideas, which are currently abstract (such as behavioural change) grass roots pilot projects with an inclination to rapid prototyping are required. This will raise aspirations and inspire action in skeptics. Thus, it is critical to identify a core group of early supporters and strategic key stakeholders with personal passion, enthusiasm, and commitment, ready to defer conventional judgment and express their willingness to stimulate breakthrough ideas.

Initial prototyping and experimentation is likely to take place in the clinical setting. However, upon development of a working program, its success depends on its distribution and scale. Thus, it is important to successfully transfer such programs to primary care, the workplace, wellness initiatives [3, 109], and the fitness industry. This can take place through licensing agreements transferring content, skills and expertise to interested health care professionals in order to create a network of branded prevention centres (Fig. 2b).

Training and education are critically important components for the development of future professionals working in the field of disease prevention and management. Currently, there is no single group of health care professionals that possess the full spectrum of knowledge and skills required for clinical work in disease prevention [64, 110]. Various components are fragmented between physicians, fitness experts, physical therapy, nursing, exercise physiologists (kinesiologists) and other professions [2]. Coordination of the development of curricula, training, and certification between and within these professions is essential. The IOC-SEM partnership has the ability to certify practitioners in prevention and management. Given the new approach to open-learning [99–101, 111, 112] resources could be made available globally, providing immediate and wide distribution and scaling. For example, the IOC has developed a 2-year diploma program in nutrition and sports medicine [99–101], but could move a step further toward integrating the prevention scholar into a network of prevention centres operating under accreditation standards. The idea is to move beyond education, training and skill development to provide essential frameworks of sound business models that allow the practice of prevention within the health care system.

This will further generate momentum for a renewed commitment to prevention even within traditional health care stakeholders. The under-representation of comprehensive lifestyle intervention, including physical activity in the curricula of medicine [113] and other health professions [64] will be addressed more efficiently, when sound and reasonable alternatives like an IOC accredited prevention program are ready at hand.

9 Conclusion

The IOC Working Group on NCD aims to establish a road map for change that respects both evidence and innovation through human-centred design. While supporting large, long-term visions that require coordinated, massive and complex political and systemic shifts, the IOC will pursue an active role with a vision focused on providing services to individual patients. Our current health care systems, with their reductionist underpinnings, can only respond awkwardly to the notion that a disruptive approach is urgently needed if we are to be successful in stemming the tide of preventable chronic disease. The issues are not those of more research and scientific evidence, sufficient funding, or health care restructuring. The issue is one of in-action,

on the one hand, and grandiose plans on the other, in the midst of an overwhelming problem and resistance to change. Creative solutions are available, beginning with evidence-based, human-centred programs to provide preventive services immediately. Leadership is the key.

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