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Futuring a world without disease: Visualising the elimination of hepatitis C

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Abstract

Informed by work on futurity in science and technology studies, we trace how global disease elimination targets perform a world without disease through their translations in visual advocacy campaigns. Treating disease elimination targets and their visualisations as performative, we take the case of hepatitis C elimination to interrogate how futuring practices in public health *govern the present* and *make effects*. We focus specifically on how World Health Organization targets in the *Global Health Sector Strategy on Viral Hepatitis* entangle with visual resources produced by the World Hepatitis Alliance *NOhep* advocacy campaign. Targets and their visual representations in campaigns perform a disease elimination future which is set apart from the present, and yet urges action in-the-now. It enacts global health citizens but separates them from localised experiences of living with, and being cured of, disease. This disease elimination future relies heavily on instrumental rationalities and logics of the present, including the privileging of biomedical technoscientific knowledge, implementation science and global health governance, to the exclusion of other matters of concern, flattening out complexity to perform its certain achievability. These enactments raise political questions about how disease elimination futures might be made in a different mode.

Key words

Hepatitis C; Targets; Futures; Disease elimination; Visual representation; Performativity.

Introduction

The control, elimination and eradication of preventable infectious diseases is a core element in global public health strategy, embedded within the United Nations 2030 Agenda for Sustainable Development (United Nations, 2015). Achieving sustainable health and development for all through disease elimination is a "quest" accompanied by "an unprecedented level of global solidarity and resolve" (Bekker et al., 2018, p.312). Aligned with this agenda, in 2016 the World Health Organization's (WHO) first *Global Health Sector Strategy on Viral Hepatitis* set a goal to "eliminate viral hepatitis as a major public health threat by 2030" underpinned by "a set of ambitious targets" including a 90% reduction in new cases of chronic viral hepatitis infections and a 65% reduction in deaths (WHO, 2016, p.21). Amidst what has been called "a new era" (Grebely et al., 2017, p.26) for hepatitis C treatment and prevention, made possible by recent biomedical and technoscientific innovations, including the development of revolutionary direct acting antiviral (DAA) treatments and testing technologies, many countries and organisations around the world are mobilising resources to implement strategies to eliminate hepatitis C.

The goals articulated within global health sector strategies (including the world's first viral hepatitis strategy) invite a universal hope for disease elimination futures. The hepatitis C field has been told that hepatitis C elimination is "within our grasp" (Harvey, 2014) and to "demand action" now (World Hepatitis Alliance, 2018). In response, a myriad of actions oriented towards attaining a hepatitis C elimination future have emerged across scientific, policy and advocacy domains. The futuring practices of mathematical modelling (e.g. Martin et al., 2013; Razavi et al., 2017), country-level strategy development (e.g. Papatheodoridis et al., 2018), data generation and progress monitoring (e.g. Center for Disease Analysis Foundation, 2019; WHO, 2019), and advocacy campaigns in different ways, and together, work to *represent* and *perform* what disease elimination futures might become, making "elimination a reality" (World Hepatitis Alliance, 2018).

Within this suite of practices, global targets do particularly significant work to give a sense of accuracy and control over diffuse and imagined disease elimination futures, by making the problem of disease elimination manageable, recognisable, enumerated and therefore able to be acted upon (Lancaster et al., 2019; Merry, 2016; Rhodes & Lancaster, 2020; Shore & Wright, 2015). As technologies of governing, global elimination targets are integral to how "the end" (Gane, 2014) of hepatitis C is performed, delimiting how hepatitis C futures might be imagined (Lancaster et al., 2019). Moreover, we can observe how the seemingly remote articulations of global strategy are brought to life with renewed specificity as targets are translated into other disease elimination futuring practices and devices, for example, as targets are put to use as the end point to which mathematical modelling is fit or the temporal focal point of advocacy campaigns. The visual representations intrinsic to these practices are noteworthy, too, for how they make visible and inscribe the projected socio-political and biological events of elimination through graphs, figures and infographics, helping to materialise elimination futures. These images function as a means of communication about possible futures but are not merely descriptive or imaginary; visual representations of the future have performative capacities and constitutive effects, shaping expectations and actions in-the-now, and bringing new phenomena into being.

Futuring hepatitis C elimination

Drawing on the sociology of expectations and scholarship exploring the technoscientific governance of futures (Adam & Groves, 2007; Adams et al., 2009; Brown & Michael, 2003; Brown et al., 2000; Konrad et al., 2017; Law, 2012; Michael, 2000; Puig de la Bellacasa, 2015, 2017; Savransky et al., 2017), we examine how the global targets articulated in the WHO *Global Health Sector Strategy on Viral Hepatitis* entangle with the visual resources produced by the World Hepatitis Alliance's *NOhep* global advocacy campaign to enact particular hepatitis C elimination futures. Our goal is not merely to describe how disease elimination futures are being represented but rather to "turn the analytic gaze towards the phenomenon of future orientation itself" (Brown et al., 2000, p.4), which in

contemporary global public health is intrinsically entangled in disease elimination goals and targets, and their attendant practices. Through this analysis, we interrogate how representations of disease elimination futures *work to govern*, and *make effects*, including in the present, shaping both the present and possible futures. We do this to open up political questions about how disease elimination futures might be made in a different mode.

More than simply being a realm beyond the present, 'the future' orients actions *in* the present, with a range of effects (Adam & Groves, 2007; Michael, 2000). In the context of contemporary "technoscientific futurity" in which the innovation-driven imperative to 'advance' and 'progress' is teamed with promissory science and expectation, this is especially pertinent (Puig de la Bellacasa, 2015; 2017, p.174). The particular situated performance of futurity in the contemporary innovation age (as we find reflected in the rationalities and practices of biomedicine, implementation science and global public health strategy) produces an "ongoing sense of urgency and crisis calls to act 'now', while the present of action is diminished, mortgaged to an always unsure tomorrow" (Puig de la Bellacasa, 2015, p.694). This performance of futurity has the effect of producing a "permanent precariousness" and restlessness in the experience of the everyday, meaning that 'the future' is therefore "crucial in '*constituting*' the present" (Puig de la Bellacasa, 2015, p.694, emphasis added).

The effects that imagined futures have in the present also in turn shape the making of possible futures. Since practices of risk-management, prediction and forecasting – and indeed disease elimination strategy and target-setting – "orient social action in the present" (Savransky et al., 2017, p.4), these routine technoscientific and policy practices provide more than merely knowledge of the future to come. Significantly they "become *factors* in the constitution of a yet-to-come" by presupposing that futures are ultimately "a prolongation of the present" in which time moves in a linear direction, along "a modern arrow of progress" (Savransky et al., 2017, p.4, emphasis original). Drawing on this thinking, we suggest that disease elimination futuring practices such as target-setting imagine a linearity of the present edging forwards progressively towards 'the future',

enabling action now by managing complex unknowns with relative apparent certainty, but in doing so delimit knowing a future in any way other than what might be framed by and known in the present. Thus, as the field continues to orient efforts towards attaining disease elimination futures, through analysis of one set of visual images and the targets they enfold, we seek to point towards a broader question: what is at stake when the present is governed "as if the future is what matters most" (Adams et al., 2009, p.248)?

Approach

We focus our analysis on the online location of the World Hepatitis Alliance's NOhep campaign resources page, and in particular the suite of infographic visual resources made available in 2017 and 2018 (NOhep, 2018b; World Hepatitis Alliance, 2018). The World Hepatitis Alliance is a patient-led and patient-driven organisation representing an estimated 325 million people living with viral hepatitis worldwide (especially marginalised populations of people who inject drugs, prisoners, men who have sex with men, migrants and people living with HIV). Its global membership consists of over 280 (primarily patient-led) organisations in 91 countries working on behalf of people living with viral hepatitis to advocate, raise awareness, lobby governments and deliver interventions. Currently, only 11% of people living with viral hepatitis are aware of their diagnosis, which is a significant barrier to connecting people to care and reducing infections. In light of the advent of new revolutionary DAA treatments and testing technologies, and to meet the targets set by the WHO, the World Hepatitis Alliance aims to provide global leadership in efforts to "find the missing millions" (World Hepatitis Alliance, 2019).

The World Hepatitis Alliance established NOhep as a multi-stakeholder platform in 2016 in response to calls at the 2015 World Hepatitis Summit for a "global movement to eliminate viral hepatitis" (NOhep, 2018a). NOhep is described as a movement "aimed at uniting people from across the world to take action, to speak out and to be engaged to ensure viral hepatitis is eliminated by 2030", acting "as an accountability and advocacy tool, ensuring governments take necessary measures to meet

the targets outlined in the WHO's Global Health Sector Strategy" (NOhep, 2018a). Since its launch, the World Hepatitis Alliance's NOhep campaign has been used as a platform to expand awareness-raising activities, reaching 90 million people online, and securing commitments from over 200 medical professionals and 6 governments through the NOhep Visionaries Program (World Hepatitis Alliance, 2019). We focus on this campaign and the visual resources it has produced given its prominent global profile as the first movement of its kind, taking these campaign images as an illustrative case example of one set of material-semiotic relations in which disease elimination targets are being put to use.

Our analysis of the NOhep infographics is informed by previous scholarly engagements with visual imagery in medicine and the tradition of 'graphic medicine' (Engelmann, 2018; Green & Myers, 2010; Williams, 2012, 2014), with attention paid to the juxtaposition of text and image, as well as the stylistic qualities of infographics. In keeping with our theoretical approach we also take these images as performative materialised artefacts (Michael, 2000), thus emphasising the *materialised* form of represented futures and their relational connections as shaping the enactments and effects made possible. Indeed, the NOhep infographic images have been *designed to circulate* (Wilkie & Michael, 2009), travelling through science, policy, advocacy and clinical practice in the hepatitis C field and beyond, online and as "social media assets" (NOhep, 2018b). NOhep invites other organisations to use these images in their own campaigns, and provides resources such as a customisable poster tool to do so (NOhep, 2018a). Many of these images have also been reproduced in multiple languages including English, Russian, Chinese, French, Spanish, Arabic and Portuguese, and made available in multiple formats including PDF and JPG (NOhep, 2018b). We are interested not only in the visual representation of disease elimination futures enacted in these NOhep infographics, but also in how these representations travel and connect with other representations of elimination futures (including those advanced in implementation science, policy and clinical practice, and target-setting in particular), so as to notice the constitutive and governing effects they make.

Our analysis of these images was coded and organised drawing on Michael's (2000) schema of 'parameters' of the future, using these as a 'lever' to mobilise our theoretical approach into analytic practice. Each of the parameters were treated as analytic dichotomies or dilemmas, these being: 'distance: distal versus proximal' (how distant the future is from the present); 'subject: individual versus collective' (the entity that 'experiences' the future); 'forms of rationality: substantive versus instrumental' (representations of the future viewed in terms of two rationalities); 'valency: positive versus negative' (the future can be good or bad; represented as a place of plenty and peace, or as a time of pain and privation); and 'speed: slow versus fast' (the speed with which we approach a future). These parameters were not mobilised to give an exhaustive account of the ways in which the future is represented but rather to orientate our analysis towards the performative work and governing effects of representations of disease elimination futures. Below we thematically synthesise this analysis to focus on three primary areas: locating and advancing towards disease elimination futures; enacting subjects of disease elimination futures; and, enacting achievable disease elimination futures.

Analysis

Locating and advancing towards disease elimination futures

How 'distance to the future' is represented has effects for the kinds of claims and counterclaims made possible in the present, and for how movement towards imagined futures might be considered. How imagined futures are located as destinations can thus affect *action* in specific ways. Across the NOhep infographics analysed, a disease elimination future is specifically located in the year 2030 in accordance with the WHO global targets (see Figures). The distance to this location performs "a 'do-ability'" (Michael, 2000, p.24) to the achievement of elimination goals and targets. The year 2030 is a future located at a temporal distance which enables the claim that elimination is achievable through multifaceted intervention implementation strategies, in keeping with the logics of global health governance, implementation science and data systems. For example, in Figure 1 the

distance to 2030 is marked out by a series of steps to climb. It is specified that "what is needed" to move towards 2030 are interventions including surveillance, treatment and diagnosis. The interventions are graphically depicted using iconic representations of familiar tools of science and biomedicine (a magnifying glass, pills, syringes and a stethoscope). As represented in this image, these interventions are integral and cannot be by-passed. The juxtaposition of instructive text embedded within the image of the stairs, along with the graphic arrow pointing upwards, suggests a simple stepwise journey for the NOhep campaigner from the located present to the imagined future. The temporal distance to 2030 cannot be traversed in other ways. Elimination is achievable if interventions are delivered; but intervention is possible because the elimination future to be attained is temporally set apart enough from the present to allow for co-ordinated action within existing systems of global health governance. Distance from the present – that is, years to 2030 – becomes part of the way that an elimination future is performed as achievable through rational and instrumental action.

The way that 2030 is visually represented not merely as a target but as a *destination* is also a significant part of the future's distancing from the present, with effects for how intervention in the present can be made to matter. Across the images, 2030 is represented as spatialised and located using symbols of achievement and promise: a white flag planted to lay claim to a futurized promised land (Figure 4); a winner's ribbon marking the end of a running race (Figure 2); the peak of a summit to be climbed (Figure 1); and as a new green globe (Figure 3). Through these graphic depictions, the 2030 targets become enacted as a *place in time*, at a distance, yet to be arrived at. A "linear spatialisation" (Michael, 2000, p.24) is evoked through graphic representations of stylised racing tracks, paths, steps and bridges which connect the now with the yet-to-come (see Figures). Across the images, linear connections are represented using both mundane routes (for example, roads and bridges) but also futuristic pathways (for example, a space corridor connecting two possible worlds – one darkened black and left behind the figures, and one fresh green and ahead of them – in Figure 3). However, by representing the future as a place in time, with linear pathways to be traversed

between the now and not yet, the different images perform elimination futures variously as *both* near and far, thus revealing the complexity of the dilemma of distancing and the multiple effects these representations produce for action and intervention. The short straight running race depicted in Figure 2 invokes a hasty affect and swift movement from 2015 baselines to 2030 targets, with few encumbrances; whereas the incomplete bridges being built over a dark chasm in Figure 4 invoke uncertainty and imply that longer term, technical efforts are required to "bridge the gap to elimination" (bridge-building engineering skills and materials here become proxies for technoscientific expertise and implementation action). The space pathway between the black and green planets implies intergalactic travel, performing 2030 as an even more remote future, though the corridor is clear and smooth, with road-markings directing the way (Figure 3). In these different representations of the ease with which the distance to the future can be traversed, both *efficiency* and *risk* are being performed. Despite elimination futures being enacted as either nearer or farther, depending on the complexity of the path required to travel the distance, across all these representations *progress* is integral. Travelling the distance to elimination futures relies on innovation and technoscientific imaginaries; a sports commentator-like figure replete with a microphone tells us that this 'race' requires "*improving* data" and "*accelerating* innovation" (the text here juxtaposed with a graphical representation of an Edison light globe, a symbol of scientific progress) (Figure 2). The implication is that the tools of the present are not sufficient for actions which might attain disease elimination futures.

These visual representations of both mundane and futuristic linear spatialisation directly connect the present with the future, but in doing so also position the here and now at a distance from it. Elimination cannot be made now (it is not of this moment) if it is located as a destination to be reached 'down the road' at another date in time, requiring more innovation, progress and development. By locating an elimination future 'at a distance' in the year 2030, this imagined future is one set apart from the present (indeed, in Figure 3, it is not even of this world). As targets travel into these advocacy campaign images, hepatitis C elimination becomes distanced. It is not of the

present; it is performed as a reality yet to come, to advance towards. While it may seem obvious to suggest that the future is placed at a distance from the present, it is worth considering how this representation of disease elimination futures as being 'set apart' might have effects for bodies or affected communities being tested, treated and acted upon *in the localised present*. In this enactment, lives saved or disease transmission prevented in the present matters most for what it contributes to a global elimination future and meeting targets, and not for local communities and bodies in-the-now. How interventions like testing and treatment are made to matter is a question held over to an uncertain tomorrow.

The question of how we might advance towards a disease elimination future located *at a distance*, through intervention *in-the-now*, then becomes significant. In the case of hepatitis C, swift rate of change and rapid speed are integral parts of the technoscientific imaginary upon which reaching the target of "elimination by 2030" relies. An elimination future stabilised in a hinterland of biomedical and technoscientific imaginaries and practices is one that can be approached with great speed, following the pace of inevitable "accelerating innovation" (Figure 2). "The race to elimination by 2030" (Figure 2) in particular connotes the possibility of speedy movement towards the future. This 'race to elimination' is not unique to the NOhep campaign. It is rhetoric increasingly invoked within the hepatitis C field, as nation states are positioned against each other as assessments are made about who might be 'on track' and who is 'lagging behind' in meeting strategic elimination targets (Rhodes & Lancaster, 2020; WHO, 2019).

The 'race to elimination' performs complex relations between time, speed, rates and progress towards change. In doing so, it potentially orients actions in the present in distinctive ways. The first thing to note is that a 'race' can be conceptualised in multiple ways. A race can be thought of as a rank ordering (in ordinal variables); that is, a 'race' towards a place of first, second, third, and so on. Or a race can be conceptualised in terms of time (in continuous variables); that is, the speed with which one moves evenly along a continuum. Being placed first in a race does not necessarily mean

that one is *fast* (one could win a slow race), just as being placed last in a race does not always mean that one is *slow* (the athlete who comes last in an Olympic final 100m sprint is not a 'slow' runner). The image of the 'race' itself therefore performs differently through its various modes of measurement. As we are familiar with what a 'race' is, we intuitively hold these multiple performances together as they make up elimination futures. The 'race to elimination' represented in Figure 2 performs this multiplicity – this is a race *against* time, *in* time, and *towards* a destination. This multiplicity speaks to the hinterland of futuring practices holding this performance together. The recent dramatic speed of progress in the development of intervention technologies (including treatment and testing technologies) sits beside and *inside* the image of the 'race'. The 'raciness' of change is made possible by these technoscientific innovations. These developments make possible not only a race against time towards a 2030 target, but a particularly speedy race in time. Through its representation of the 'race', then, the infographic enacts a hepatitis C elimination assemblage, which relationally situates combination interventions and technoscientific developments alongside targets and other progress metrics.

The 'race to elimination' in Figure 2 performs more complexity still. Given the title of the infographic, and the finish line ribbon pictured, we assume this is a race to the future (to 2030 as a destination). Although on closer examination the x axis specifies that this is in fact an image depicting a 'race' to (or progress towards) achievement of *different targets*. The future is constituted through the achievement of targets, not through arrival at a point in time (as the image of the finish line – "elimination by 2030" – might imply). Read this way, each of the biomedical interventions (including treatment, diagnosis, testing, blood safety) are seemingly pitched *against each other in a race*, though their baselines and targets vary greatly. This might be read as a race *between interventions*. Although each intervention has its individual target to be achieved, the image of this particular 'race' with runners in demarcated lanes, nonetheless positions them *relationally*. In this reading, the interventions are side-by-side, separated but seemingly in competition with each other, attempting to cross the line of a single end-point. The complexity of the positioning of these

interventions in a 'race' towards targets raises a series of questions: is elimination reached when one intervention 'wins' the race? Or must all interventions 'cross the line' for elimination to be achieved? What does it mean for progress towards an elimination future to be represented as a race *between* technologies and interventions? If some are left behind through lack of investment or action, does that mean that someone or something else within the field still 'wins'? In this reading, the specificities and messiness of measurement, local practice, and the complexities of working with marginalised populations and hidden epidemics are erased. Interventions are racing as singular entities such as "Hep C Diagnosis", "Hep C treatment" and "Harm Reduction" (Figure 2). The diversity of practices which might fold into any one of those categories, let alone the more complex question of what each of those interventions might become through local implementation practices (Rhodes & Lancaster, 2019) are simplified. This representation performs interventions as singular, stable and able to be implemented consistently in a globalised way, unchanging across time in the "race to elimination by 2030". However, as noted earlier, the 'race' performs *multiply*. In another reading, we might say that there is a collective and *shared* orientation to the speediness of the elimination race. Here, through combination interventions, all are moving quickly to contribute to getting "us across the finish line" (Figure 2). This, then, is a race within a race with the same elimination end point, with actors in this assemblage working together, racing side by side in parallel, their efforts directed towards steadfastly progressing *forward.* We find a multiplicity of races enacted within this virtual-singular disease elimination assemblage.

Enacting subjects of disease elimination futures

But who or what are the 'subjects' of this disease elimination future? Who or what advances towards this destination or bears this future circumstance? In many ways what is represented across the NOhep infographics could be described as an anthropocentric future. In keeping with priorities articulated within the WHO targets, what occupies these futures are "lives saved" (Figure 3), "reduction in deaths" (Figure 1) and bodies "treated", "tested" and "diagnosed" (Figure 4). The

juxtaposition of numbers with human figures, connects data to bodies. Although ostensibly anthropocentric, these images nonetheless depict faceless 'nowhere' people in many ways devoid of cultural identity or connection to place or time. There is some representation of diversity through variations in skin colour and haircuts, but also a dehumanising and standardising of bodies through the simplified cartoon-like representation of people as repeated paper-doll cut-out figures. In many of the images, these paper-doll cut-out figures are also branded with the NOhep logo – these bodies belong to the campaign (see Figures 1, 2, 3). To be represented as 'anywhere' or 'nowhere' people also necessarily means *not* belonging to any particular nation, community, time or place. Thus, these cartoon-figures enact *global health citizens*. While the remote and dehumanised enumerations of the WHO elimination targets partially find a form of embodiment as they travel into these globally circulating images, the subjects of the elimination futures could nonetheless be anyone and no one. This flattening of bodies and affect is performed in a hinterland of practices which orients to hepatitis C elimination being enacted in relation to enumerated indicators and time.

What is obscured in these representations of disease elimination futures are the situated health and social effects of hepatitis C in subjects' lives. The virus, and experiences of living with it, are represented through aggregated data which is then reformed into standardised bodily shapes. The juxtaposition of numbers and standardised bodily images is significant. For example, in Figure 4, the outline of a human figure is used to convey the numbers of people living with hepatitis C who have received treatment and accessed DAA therapies (the epidemiological data emanates as a thought-bubble from this blank-faced figure's head). The proportion of people treated in 2030 is represented by black and white images of repeated paper-doll cut-out figures; 8 out of 10 figures being white ("80% treated by 2030") with two figures shaded out in black. An elimination future is one in which 'lives are saved' as targets are met, but these 'lives' are disconnected, disembodied and un-situated. People are data. As viewers we are asked to anticipate an elimination future, "join" the campaign (Figure 3), take responsibility in the present for the implementation tasks at hand (testing, treating, data systems), and "make the elimination of viral hepatitis our next greatest achievement" (Figure 3)

but we are not invited to identify with or imagine the specificities of the lives of subjects within it (and especially the marginalisation of the populations primarily affected). The graphical techniques employed means that these images do not invite us to reflect on the implications for those lives *not* saved (the shadowy figures are simply blackened out and fade away, much like the shadowy black globe of 2016 left behind in Figure 3). What is represented is an aggregated, enumerated, data-driven, technoscientific future of global elimination achievement.

Although Michael (2000, p.27) argues that to "focus on the futures of individual sufferers is, possibly, to neglect implications for collectives" in this context we might also wonder what representing lives through numbers and faceless figures, and erasing the specificities of experiences of living with hepatitis C, or the specificities of epidemics in particular locations, performs? Despite the historical entanglement of hepatitis C and stigma (Fraser & Seear, 2011), we suggest that this enactment of a technoscientific, instrumentally achieved, global elimination future has the effect of erasing specific, localised experiences and enactments of the disease. In doing so, however, these enumerated and locally-detached hepatitis C futures nonetheless enact a new collective, forming new attachments in a globalised network of disease elimination. This globalised and enumerated collective is enacted and located differently (away from the local particularities of communities and experiences) and yet, we suggest, is no less material.

Enacting achievable disease elimination futures

Although these campaign images and the targets enfolded within them lay claim to a new (almost utopian) world, this disease elimination future nonetheless relies on principles of foreseeability. It extrapolates from the present. The predicted impact of technological solutions for achieving elimination targets are projected from today's conditions, relying on claims of effectiveness and impact evidenced in the present as well as assumptions about the continuity and longevity of global health governance, implementation practices and innovation. In Figure 2, we are told that "what is required to get us across the finish line" is "improving data", "closing gaps in prevention", a "public

health approach", "accelerating innovation" and "scaling up testing and treatment". Underpinning this representation of an elimination future is an assumption about the enduring nature of hepatitis C as a biomedical problem, to be solved through evidence-based technoscientific means, in a globalised world of public health governance. The stylised racetrack (Figure 2), steps (Figure 1), bridges (Figure 4), and pathways (Figure 3) also serve to visually *connect* futures to present conditions and evidencing of what is yet to come – making the future foreseeable and 'realistic'. Numbering also performs this foreseeability and control through graphical representation of downward arrows and shifts and moves in enumerations (Figures 1 and 3).

Yet, this kind of realism might also reduce the possibilities and options available to decision makers, implementation scientists and, indeed, affected communities. The achievability of this elimination future relies on its 'realistic' connection to the present and what is made possible by data systems, biomedical technology and implementation strategies. However, in doing so, it simultaneously reduces what may come together to constitute an elimination future to precisely these parts, to the exclusion of other possible elements. It is here we see the work of targets as they entangle with other practices. The infographics reproduce, in a relatively clean way, the futures delineated in global policy without stepping beyond these, making absent the enactment of alternative disease elimination futures (for example, imagining disease elimination futures in relation to community agency or activism which might perform those imagined futures as social inclusion or citizenship, rather than merely enumerated reductions in infections and deaths). We are not invited to imagine – to *speculate* about – an alternative view of what the future might be for hepatitis C or for the people who live with this disease. There is not room to ask if "there is something more important" (Stengers, 2005, p.994). By relying so squarely on the instrumental rationalities of the present (including the logics of global health governance, technoscientific innovation, and evidence-based intervention) it could be argued that "a poverty of imagination" (Michael, 2000, p.29) encompasses both the present and imagined futures, to the exclusion of other ways of doing and knowing (as we observed earlier, there is only one linear path to this fixed destination). "Elimination by 2030" is an

endpoint not opened for question, and the claims to realistic accomplishment of this goal serve to embed this particular future even further.

The cartoon-like imagery of flattened landscapes in the NOhep infographics perform a simpler world, sanitised of the inherent messiness, failures, politics and labour of global public health and local implementation practices. Data too are represented in ways that contain the mess of research and epidemiological estimates (for example, in the form of a lightbulb signalling the proportion of people aware of their infection, or free-floating line-arrows simply pointing up or down to indicate increases or decreases in new cases per year: Figure 3). Each of the images place delivery of biomedical interventions (including treatment and prevention technologies) at the centre of the achievement of elimination futures, erasing the complexities of funding, health systems, inter-governmental cooperation, pharmaceutical pricing, punitive drug control laws, and even other competing health priorities. Indeed, in Figure 3 deaths attributable to hepatitis are shown in a graph-like column, juxtaposed alongside columns comparatively indicating the number of deaths associated with malaria and HIV/AIDS. In a second image within Figure 3, a 65% reduction in hepatitis-related mortality is depicted by a smaller, green column in the year 2030 while deaths associated with the other two diseases remain consistent across the two 'column graphs' from 2016 to 2030 (the malaria and HIV/AIDS columns are simply shaded out in black). Here, is a 'good' hepatitis elimination future contingent on another 'bad' future? Does investment, effort and action in one domain mean limiting opportunities for intervening in other health conditions? Of course, the WHO has set global targets relating to all these global diseases, however the future enacted in this representation is one in which the 'good' of hepatitis elimination is prioritised over other possible (more holistic) health futures.

On the whole, the 'realistic' and foreseeable hepatitis C elimination futures represented here perform certainty and achievability. However, the narrative techniques of the graphics leave some room for doubt: Figure 1 depicts an unstable, rocky penultimate step on the climb to elimination;

and in Figure 4 the image of a dark chasm with incomplete bridges portrays the challenge still ahead. Although "obstacles" are depicted, it is also implicit that these are obstacles which can be overcome through implementation efforts and action. 'Realistic' challenges are depicted (which, arguably, make the possibility for this imagined future more compelling), however the reliability and effectiveness of technoscientific and biomedical technologies (including testing, treatment, prevention interventions) is not brought into question. The unequivocal representation of data and evidence (appearing as single numbers, often without referencing) reassures that we not only know what works, but also how to measure and monitor the making of this achievable future without disease. This is a future made certain through trust in the promise of technoscience and evidence; it is only less certain insofar as it is contingent on us doing what we know ought to be done. What is remarkable is the way that uncertainty, probabilities and scenario testing which are the very hallmarks of the mathematical modelling research underpinning elimination estimates and targets are erased, along with the complexities of generating population prevalence estimates or assessing the global burden of disease. In some ways these limitations – these uncertainties, caveats or contingencies – are what would ordinarily signal confidence in good research. But raising uncertainty would only limit the foreseeability of disease elimination as "our next greatest achievement" (Figure 3).

Conclusions

Through our analysis, we have observed the performative and delimiting work of global targets as they entangle with the visual resources of advocacy campaigns to enact disease elimination futures. Targets orient towards a specifically located desired future in which disease elimination can be secured and transmission halted. In doing so, the disease elimination futures imagined within target-setting and global strategies orient action in-the-now, working to govern the present and shape futures. The constitutive effects of this intrinsic future orientation become even more noticeable when we examine the work targets do as they are translated, materialised and stabilised in relation

to a hinterland of other disease elimination futuring practices (including advocacy, implementation science, mathematical modelling, and global health governance). It is our contention that how disease elimination futures are imagined matters greatly. As Konrad et al. (2017, p.478) note, "if modes of future orientation help to produce the present, they also undoubtedly materially shape the future, and this raises questions relating to the politics not only of how particular future expectations and images become hegemonic but also of how we live the future in the present".

The future being made

We have begun to tease out these political implications, and in particular, how it is that targets govern through their entanglements with other material-discursive practices. We have observed how targets and their visual representation in campaign materials perform an elimination future which is set apart from the present, and yet urges action and innovation in-the-now, as we progress swiftly towards the future. It is a future which enacts and enjoins global health citizens but separates them from localised and embodied experiences of living with, and being cured of, disease. Moreover, it is a future which relies heavily on instrumental rationalities and logics of the present, including the privileging of biomedical technoscientific knowledge, implementation science and global health governance, to the exclusion of other matters of concern, flattening out complexity and smoothing out mess to perform its certain achievability. We suggest that these enactments raise numerous questions. If elimination futures are located in a specific place in time, set at a distance from the present, what happens if this elimination future is not reached by this time? What if the 'place' arrived at in 2030 is not recognisable? How might cure or transmission prevention in local communities and bodies nonetheless be made to matter if elimination targets are not achieved? Although these may seem like facetious questions, they are revealing of the ways that the particular disease elimination future performed forecloses possibilities for other contingencies or futures arrived at via different paths. These are, therefore, *ontopolitical* concerns, with material effects.

By raising these questions and engaging critically with disease elimination targets and the futures they enact, our aim is not to impede elimination efforts in any way. Rather, we seek to engage "with what is already ongoing, already happening in the world with an explicit view to what *might be* in the world *in a different mode*" (Marres et al., 2018, p.30; Rosengarten, 2018). Paying attention to the constitutive effects of practices allows for speculative questioning of how realities could be done not only differently but also *well* (Law, 2012; Mol, 2002). We have noticed how some disease elimination futuring practices – such as target-setting – depend on "closing down" (Rosengarten, 2017, p.78) rather than attending to more divergent worlds and what they might afford. However, we suggest that the rationalities and logics of the present need not be the only conditions on which elimination futures must rely. Indeed, although the disease elimination futures represented in these infographics make claims to realism to perform their 'do-ability', through their connection to discourses of hope these images s*imultaneously* perform the promise of revolutionary change. Thus, the challenge for the field is to consider how we might, through our engagements with disease elimination futuring practices, remain open to a "world where many worlds fit" (Stengers, 2018, p.83).

The future possibilities before us

We can begin to speculate as to how we might come to know and constitute disease elimination potential through other means, and therefore govern the present in a different and less constraining mode. We can, for example, speculate as to what elimination futures imagined as closer to the present might afford local intervention, rather than putting off disease elimination realities as matters for tomorrow. Resisting the foreclosing tendencies of global public health strategy might require paying attention in different ways, staying open to the possibilities of situated disease elimination futures in which elimination can be made to matter locally for communities, people, experiences and collectives, rather than performed merely as a mass biomedical and technoscientific event, a world apart, in a remote place and time. We might ask how the subjects of

elimination futures could be imagined as embodied, relational, socially and materially connected, and, relatedly, how we might think-with the rationalities of situated and local knowledges through those engagements. We might also consider how to live better with uncertainty in the quest for disease elimination futures and remain open to multiple contingencies. Thus, we suggest that beyond the question of what futures *do,* lies another: "Is another future possible?" (Savransky et al., 2017, p.1). By posing this question in the context of global public health and disease elimination we seek to open up possibilities for "futures that are more than a mere extension of the present" (Savransky et al., 2017, p.2) and for making more liveable and sustainable worlds.

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Figures

Figure 1

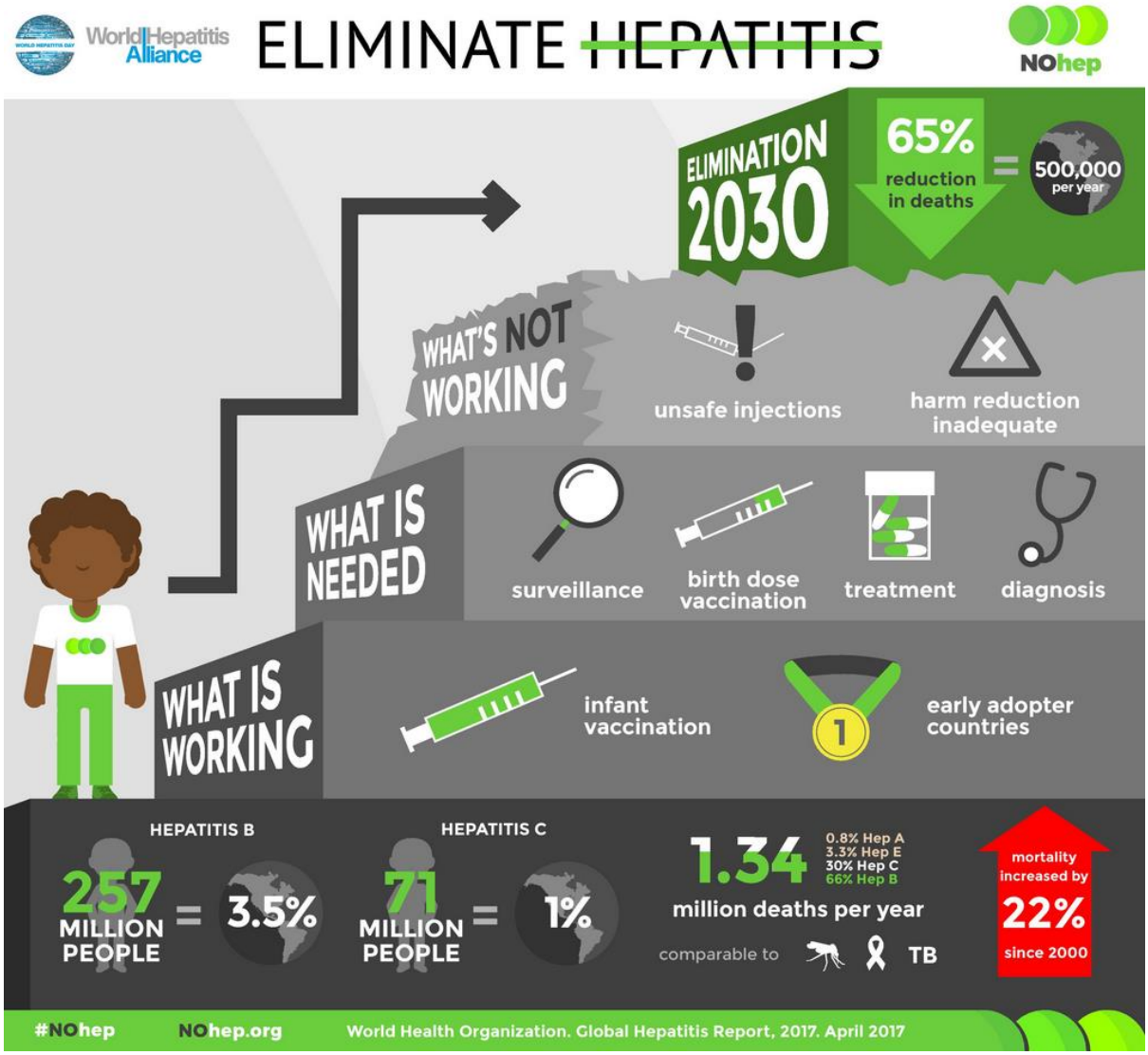


Figure 2

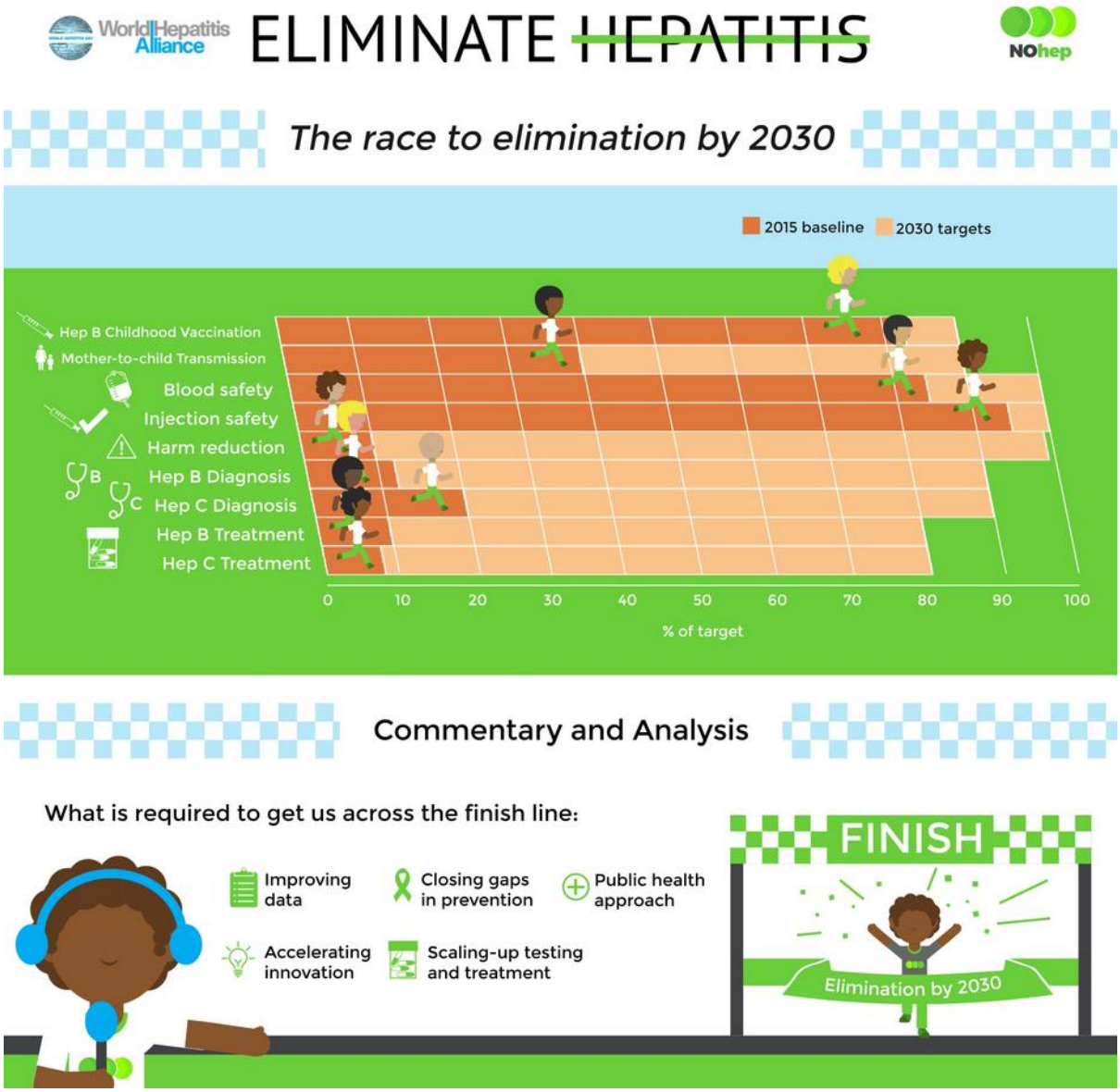

World Hepatitis Alliance
ELIMINATE HEPATITIS
NOhep
The race to elimination by 2030
2015 baseline
2030 targets
Hep B Childhood Vaccination
Mother-to-child Transmission
Blood safety
Injection safety
Harm reduction
Hep B Diagnosis
Hep C Diagnosis
Hep B Treatment
Hep C Treatment
0
10
20
30
40
50
60
70
80
90
100
% of target
Commentary and Analysis
What is required to get us across the finish line:
Improving data
Closing gaps in prevention
Public health approach
Accelerating innovation
Scaling-up testing and treatment
FINISH
Elimination by 2030

Figure 3

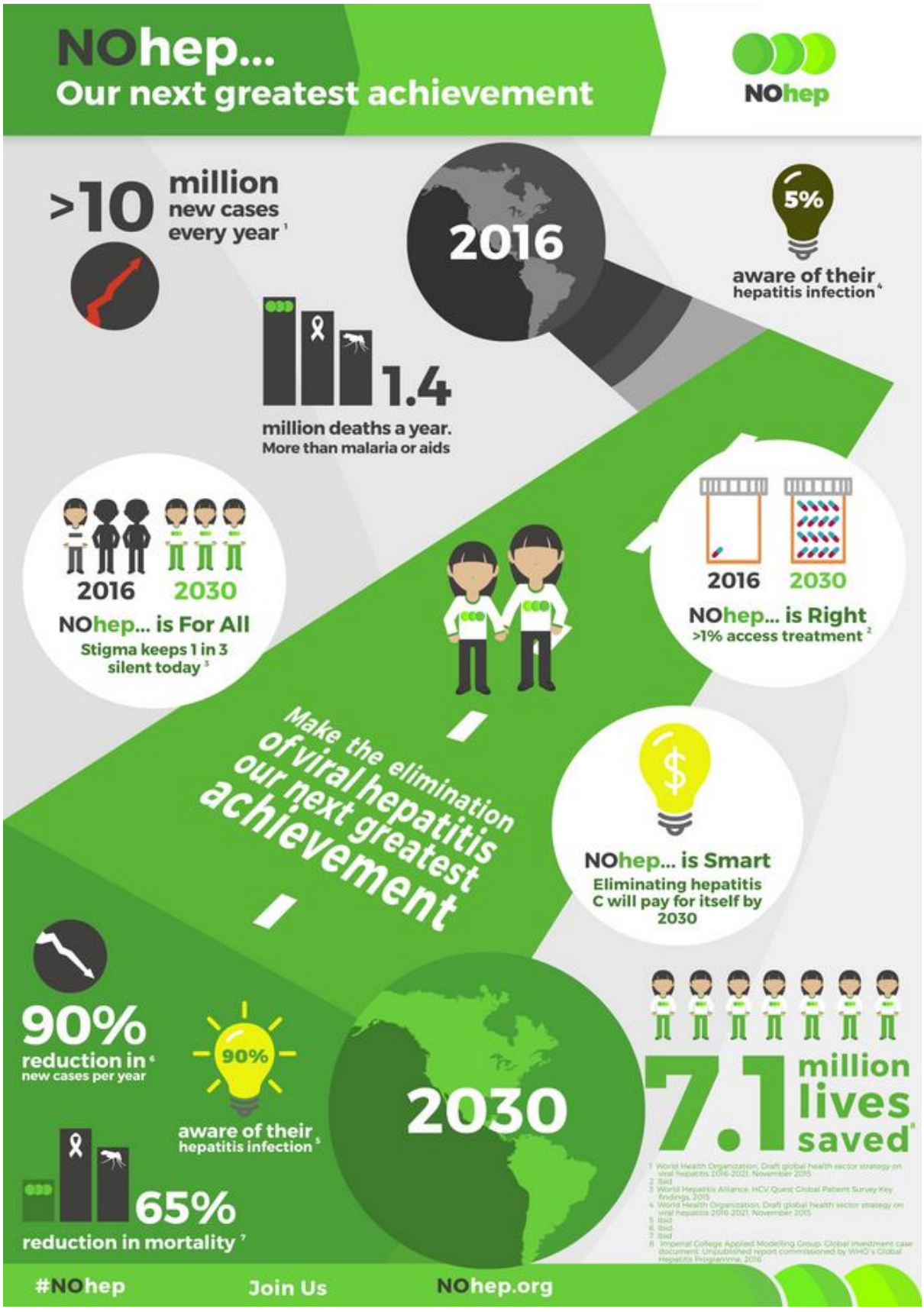
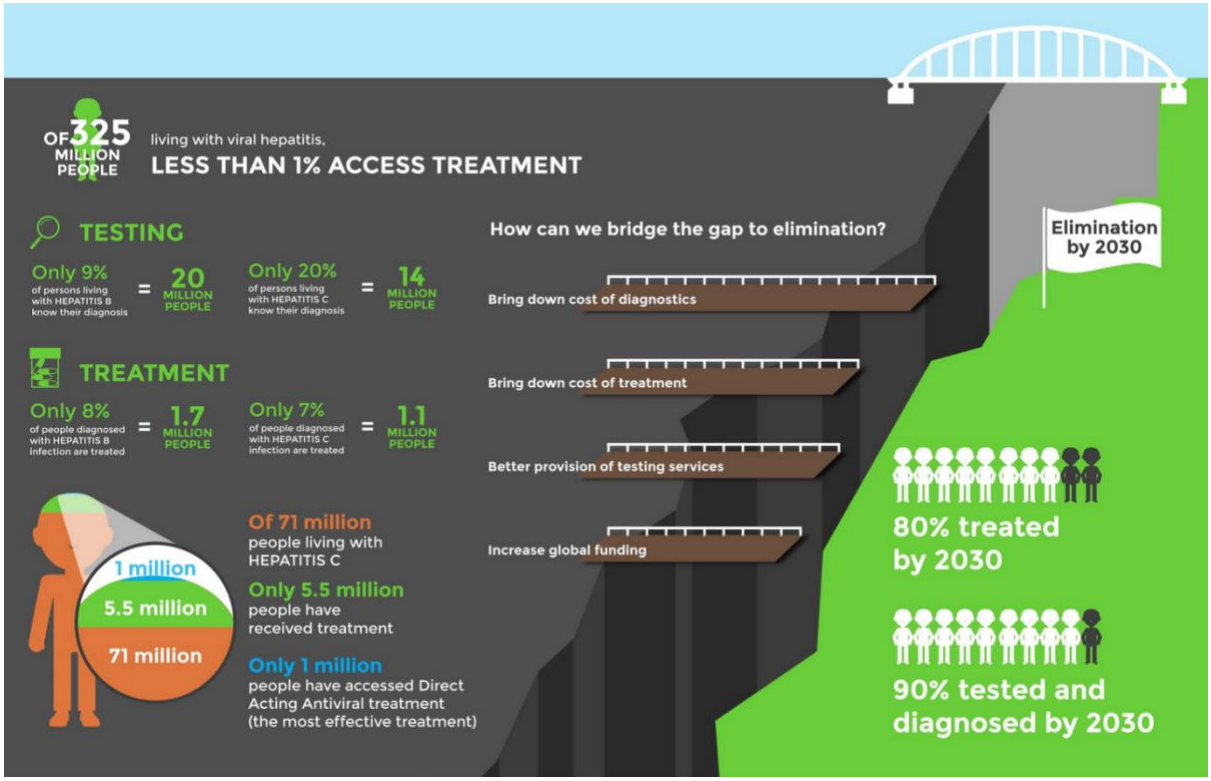

NOhep...
Our next greatest achievement
NOhep
>10 million new cases every year 1
2016
5%
aware of their hepatitis infection 4
1.4
million deaths a year.
More than malaria or aids
2016 2030
NOhep... is For All
Stigma keeps 1 in 3 silent today 3
2016 2030
NOhep... is Right
>1% access treatment 2
Make the elimination of viral hepatitis our next greatest achievement
NOhep... is Smart
Eliminating hepatitis C will pay for itself by 2030
90%
reduction in 6 new cases per year
90%
aware of their hepatitis infection 5
2030
7.1 million lives saved
65%
reduction in mortality 7
#NOhep
Join Us
NOhep.org

Figure 4


OF 325 MILLION PEOPLE
living with viral hepatitis,
LESS THAN 1% ACCESS TREATMENT
TESTING
Only 9% of persons living with HEPATITIS B know their diagnosis = 20 MILLION PEOPLE
Only 20% of persons living with HEPATITIS C know their diagnosis = 14 MILLION PEOPLE
TREATMENT
Only 8% of people diagnosed with HEPATITIS B infection are treated = 1.7 MILLION PEOPLE
Only 7% of people diagnosed with HEPATITIS C infection are treated = 1.1 MILLION PEOPLE
1 million
5.5 million
71 million
Of 71 million people living with HEPATITIS C
Only 5.5 million people have received treatment
Only 1 million people have accessed Direct Acting Antiviral treatment (the most effective treatment)
How can we bridge the gap to elimination?
Bring down cost of diagnostics
Bring down cost of treatment
Better provision of testing services
Increase global funding
Elimination by 2030
80% treated by 2030
90% tested and diagnosed by 2030