

Evaluating and communicating Hepatitis C Cascades of Care data: A journey towards elimination in Tayside, Scotland

Cassandra Baiano, BA (Hons), BA, MSc
2nd Year ScotGEM MBChB Candidate

Background: Hepatitis C Virus (HCV)

- One of the world's leading causes of liver cirrhosis and hepatocellular carcinoma (1)
- Presents a significant burden to health systems across the globe and affects ~34,500 in Scotland (2)
- Transmitted through blood-to-blood contact, no vaccine, antibodies not protective?
- The World Health Organization (WHO) set 2030 Elimination Goals
- Each health system to evaluate own epidemic

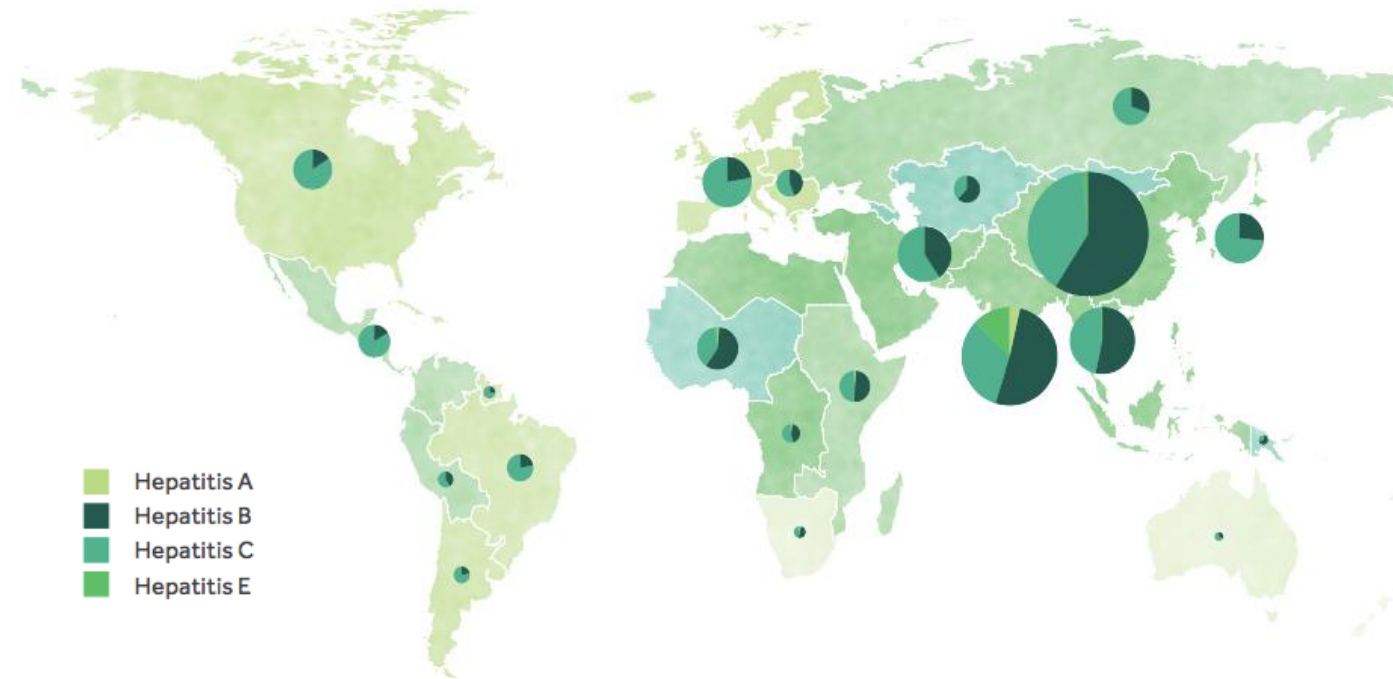


Figure 1. – Regional distribution of viral hepatitis deaths (3)

Background: Cascade of Care

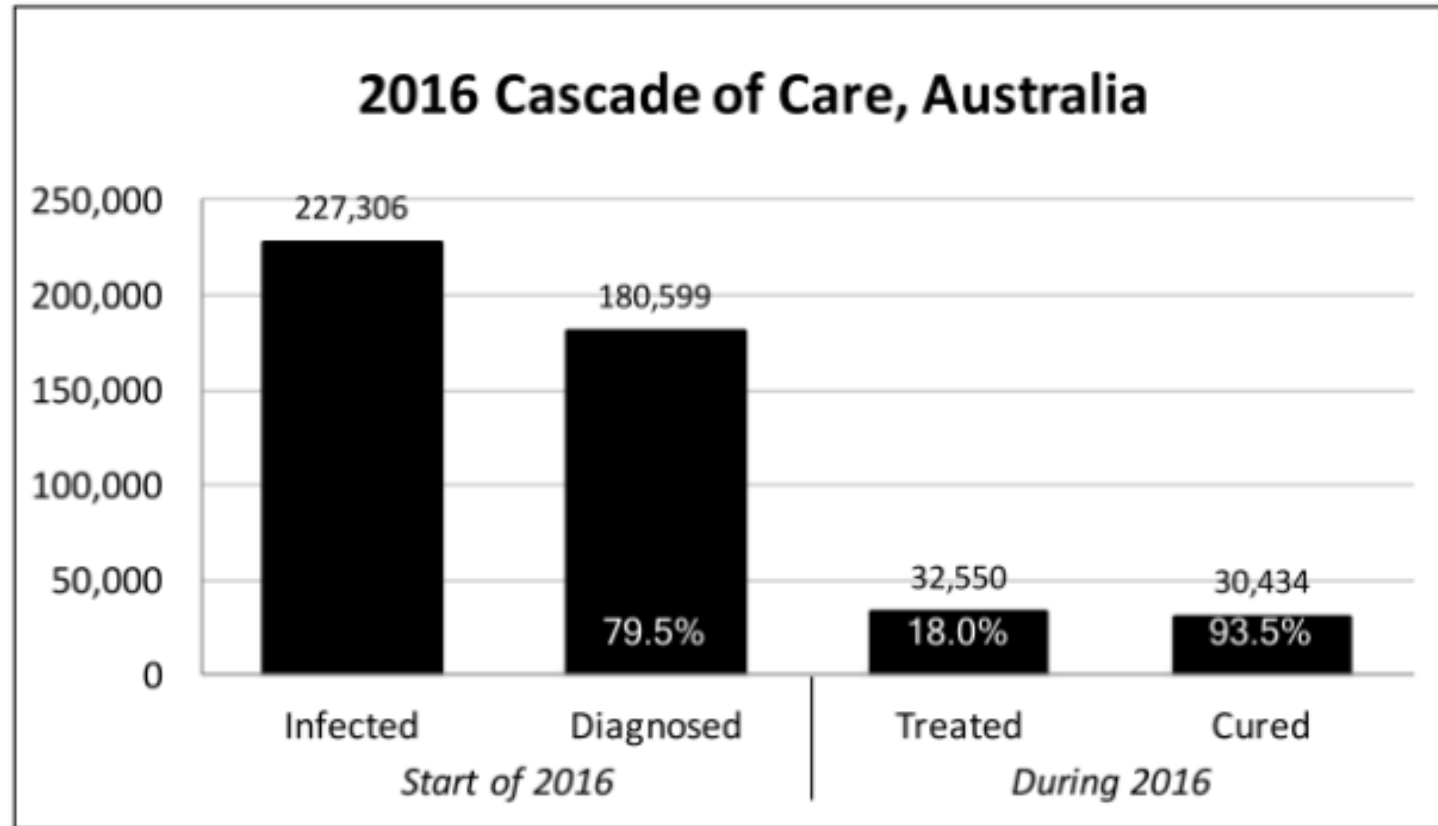
Cascades of Care (CoC) are used to depict how infected cases move through disease control stages



Methods of communicating HCV Cascade of Care data are debated (4)

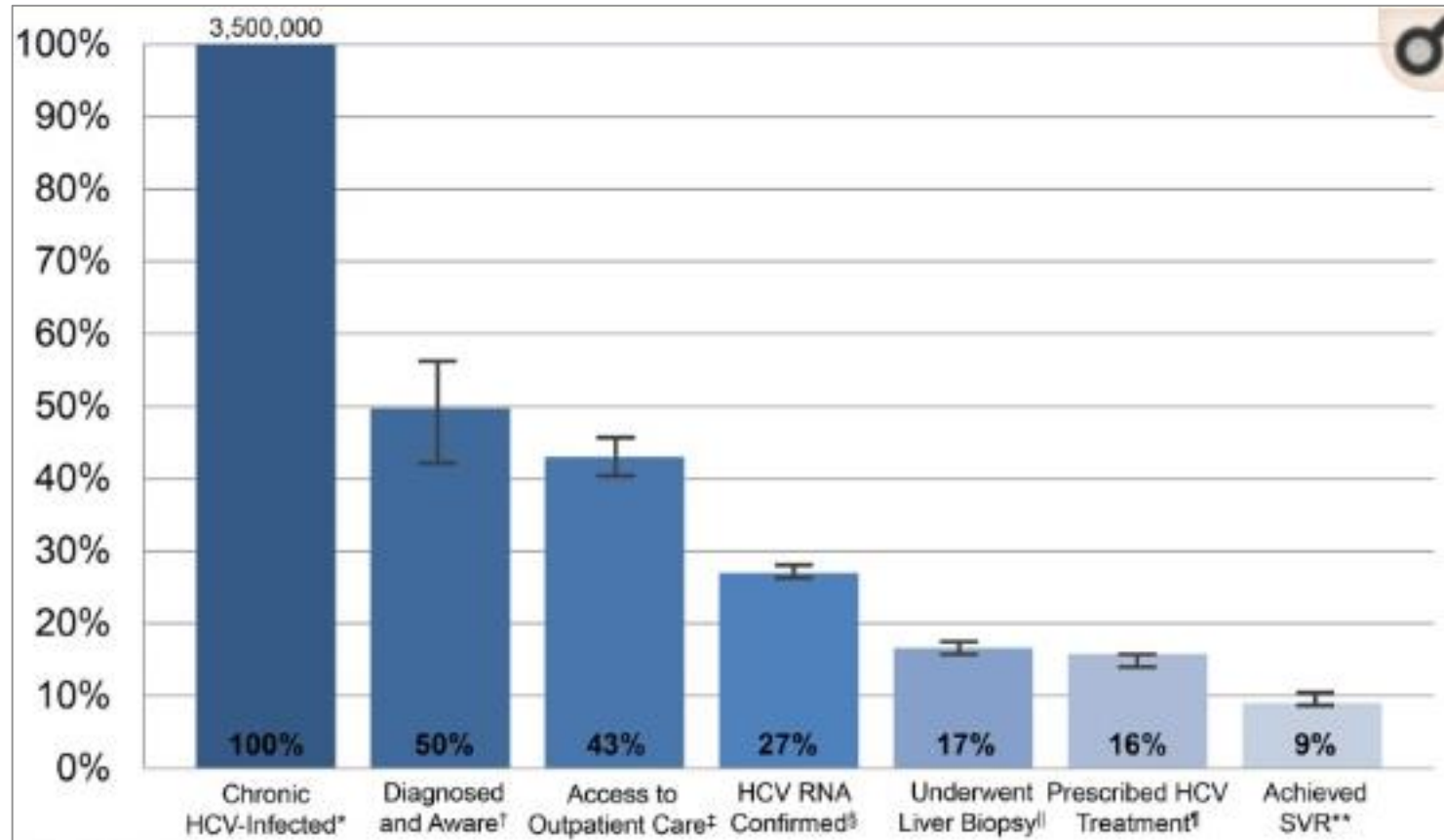
Background: Data Communication Debate

Figure 3. – Basic Cascade (4)



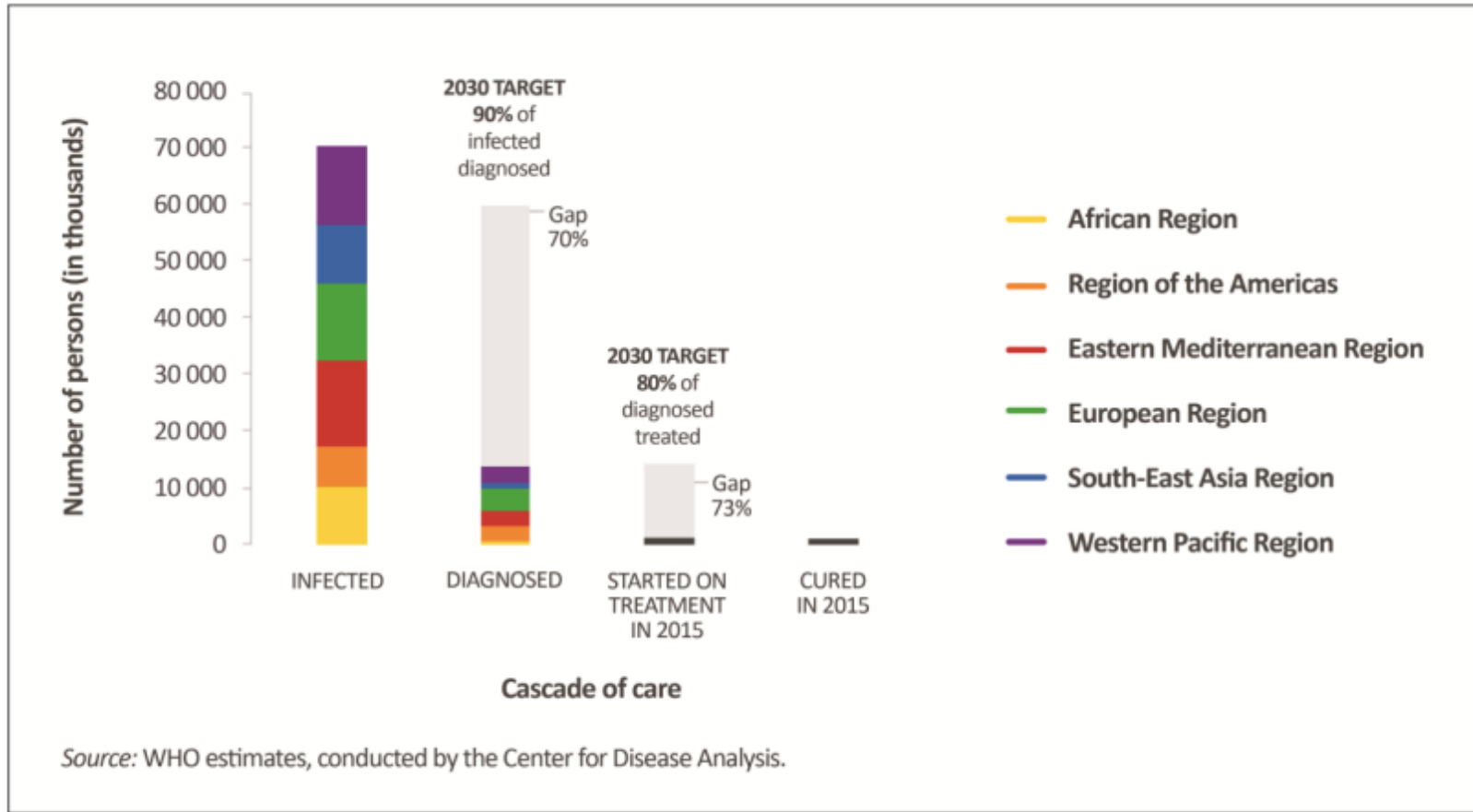
Background: Data Communication Debate

Figure 4. – Added Stages + Conversion Rates (6)



Background: Data Communication Debate

Figure 5. – Target Driven (4)



Objectives

- Produce a novel, systematic way of codifying HCV data and communicating it with a Cascade of Care
- Use the HCV data in Tayside, Scotland to provide examples of insights gained from communicating data in this way

Methodology: Sources and Cohort Selection

Tayside's HCV database has information on over 3900 patients' timeline

Inclusion Criteria	Exclusion Criteria:
<ul style="list-style-type: none">▪ Alive at any point from January 2015 – December 2018▪ In Tayside (including those in custody of Tayside HMP)▪ With at least one HCV infection (Antibody positive, PCR positive) <p>Plus:</p> <ul style="list-style-type: none">▪ Diagnosed and treated before 2015 without a successful SVR▪ A positive antibody test and no PCR data▪ 9 patients treated with DAAS starting in 2014 and ending in 2015	<ul style="list-style-type: none">▪ Any patient treated and cured prior to 2015▪ Spontaneous resolvers (Antibody positive, PCR Negative)▪ Tayside residents still in custody of HMP outside of Tayside

Final cohort - 1164 cases

Results

This study produced three results:

1. Standardised coding framework
2. Model stacked clustered bar chart
3. Model cumulative line graph

Coding Framework

Old Coding	New Coding
Diagnosis	New Diagnosis
	Previous Diagnosis
	New Diagnosis Can't Treat
	Previous Diagnosis Can't Treat
	Diagnosis - Dead
Treatment	New Diagnosis Treatment
	Previous Diagnosis Treatment
	Treatment Unsuccessful
	Treatment Incomplete
	Treatment - Dead
Cure	Cure
	Unknown SVR
	Cure - Dead

Model Stacked Clustered Bar Chart

Diagnosis

- New Diagnosis
- Previous Diagnosis
- Diagnosis Can't Treat
- Previous Diagnosis Can't Treat
- Diagnosis - Dead

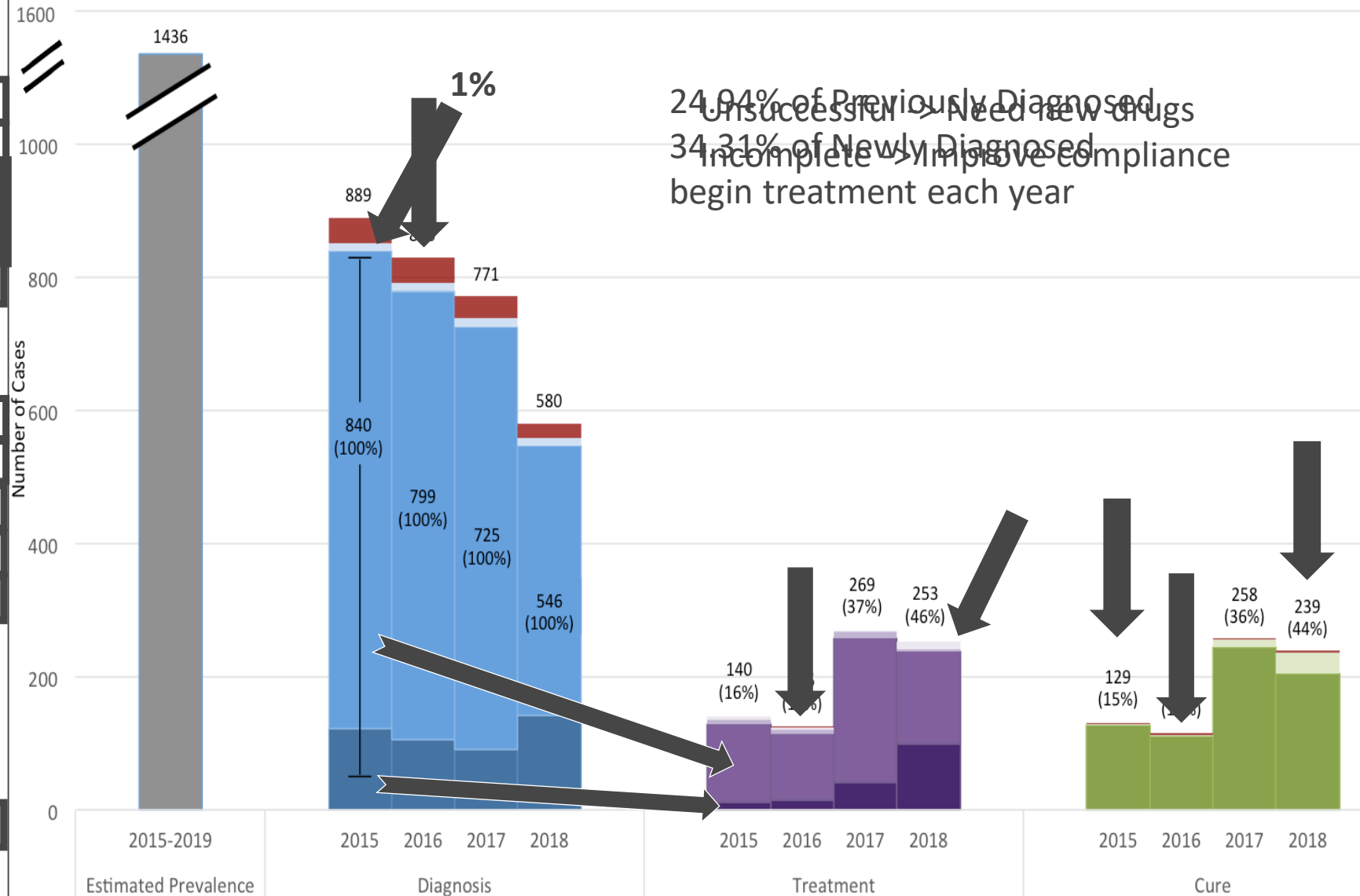
Treatment

- New Diagnosis Treatment
- Previous Diagnosis Treatment
- Treatment Unsuccessful
- Treatment Incomplete
- Treatment - Dead

Cure

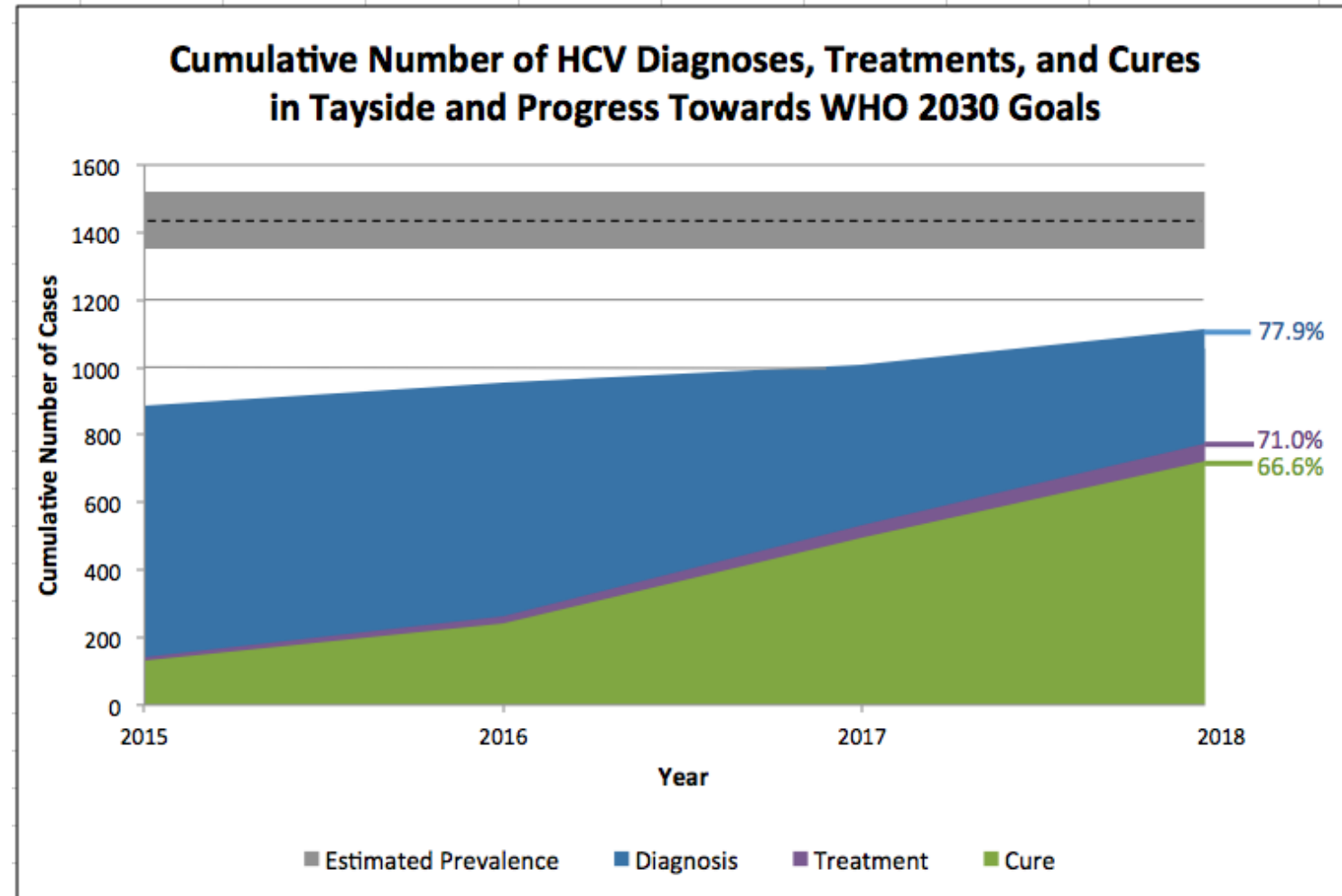
- Cure
- Unknown SVR
- Cure - Dead

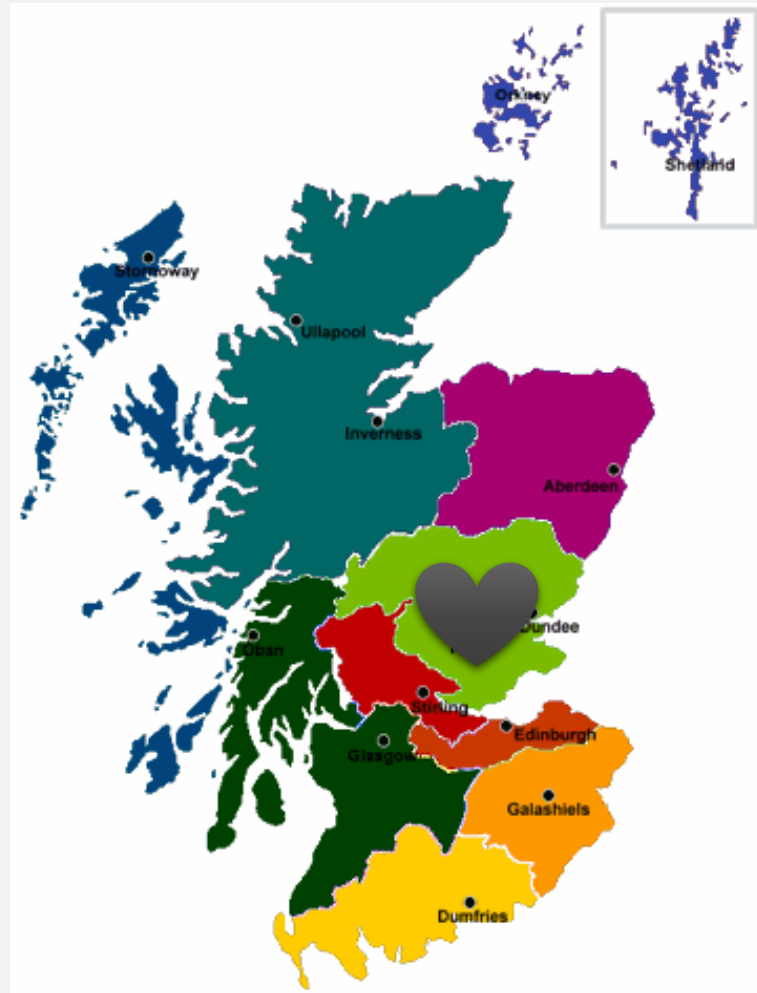
Tayside HCV Cascade of Care
January 2015 - December 2018



Model Cumulative Line Graph

- Progression towards target Diagnosis, Treatment, and Cure rates
 - WHO 2030 Goals are: 90% of prevalent cases diagnosed, 80% of eligible diagnoses are treated
 - Tayside has diagnosed 77.9%, treated 71.0% of those eligible, and cured 66.6%





Conclusions

- Novel way of communicating Cascades of Care data
- Coding framework standardises definitions
- Graphs offer insights to health care planners
- Providing a new option that the WHO could offer to track global infectious epidemics
- Improve local service evaluation and planning as well as knowledge exchange across global health systems

References

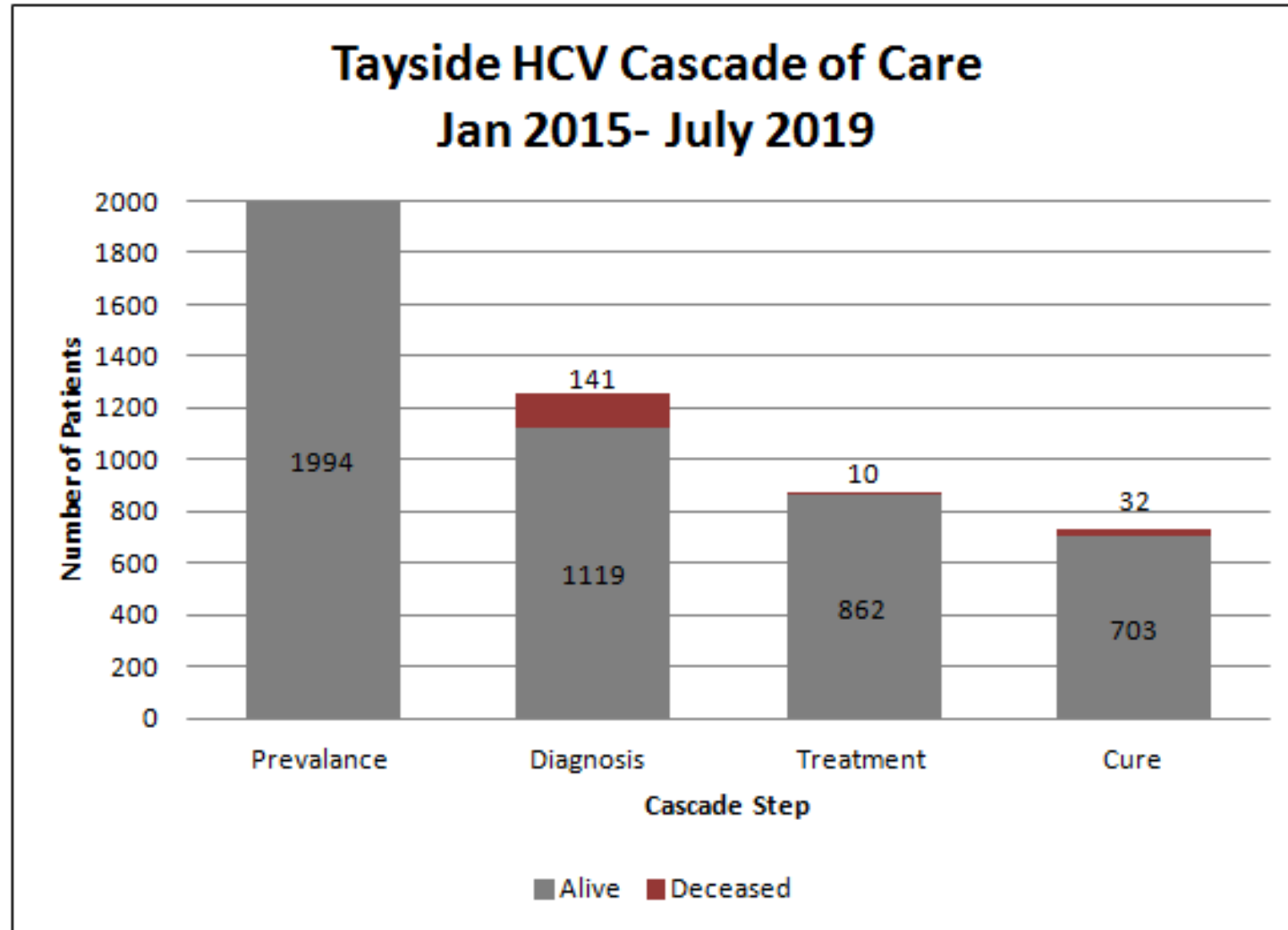
1. Eliminating Hepatitis C in Scotland: A Call to Action [Internet]. [cited 2019 Aug 8]. Available from: <http://www.hepctrust.org.uk/sites/default/files/Eliminating%20Hepatitis%20C%20FINAL.pdf>
2. World Health Organization, World Health Organization, Global Hepatitis Programme. Global hepatitis report, 2017 [Internet]. 2017 [cited 2019 Aug 8]. Available from: <http://apps.who.int/iris/bitstream/10665/255016/1/9789241565455-eng.pdf?ua=1>
3. Combating Hepatitis B and C to Reach Elimination by 2030 [Internet]. [cited 2019 Aug 6]. Available from: https://apps.who.int/iris/bitstream/handle/10665/206453/WHO_HIV_2016.04_eng.pdf;jsessionid=F2CEE42701151DF7FA053C5A3D08B210?sequence=1
4. Safreed-Harmon K, Blach S, Aleman S, Boe Kielland K, Bollerup S, Cooke G, et al. The Consensus Hepatitis C Cascade of Care: standardized reporting to monitor progress toward elimination. Clin Infect Dis [Internet]. [cited 2019 Sep 26]; Available from: <https://academic.oup.com/cid/advance-article/doi/10.1093/cid/ciz714/5540024>
5. Vital Signs: HIV Prevention Through Care and Treatment — United States [Internet]. [cited 2019 Jul 29]. Available from: <https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6047a4.htm>



Questions & feedback 😊

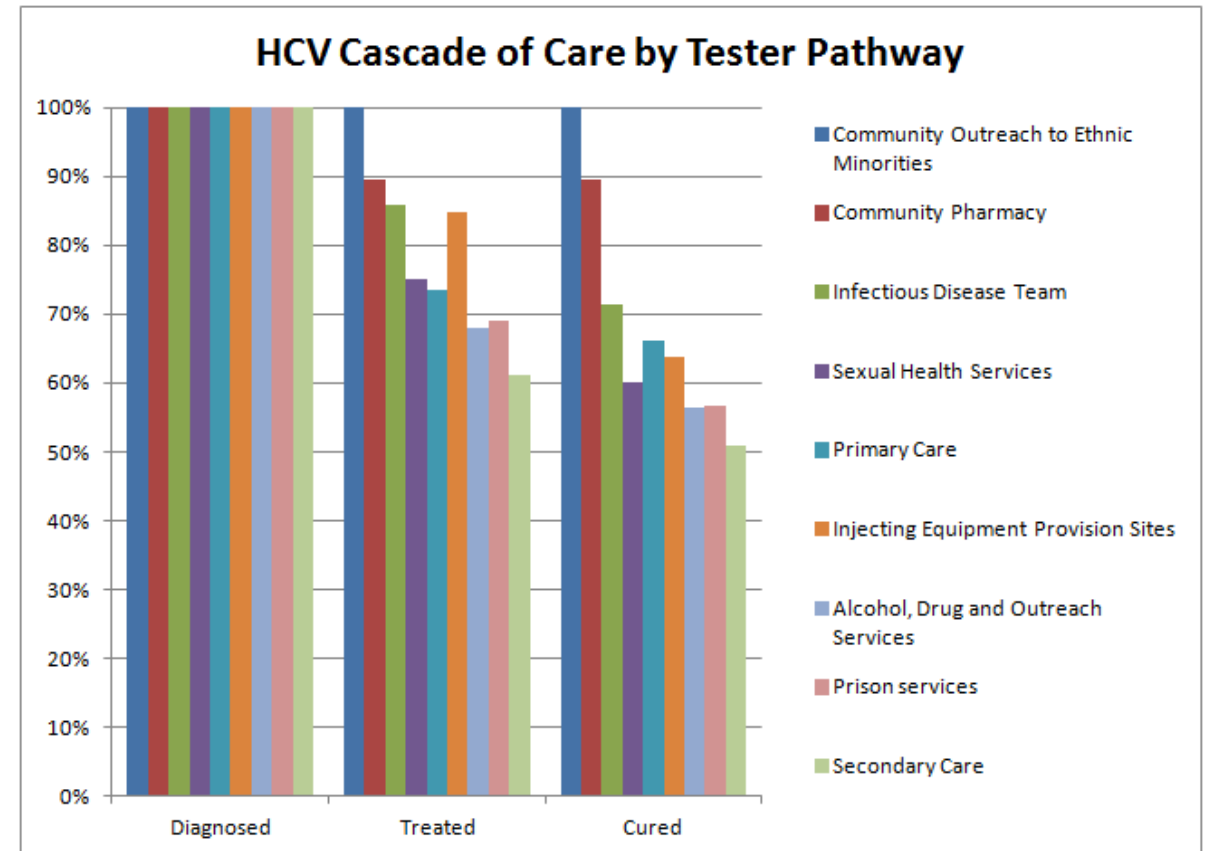
cb371@scotgem.ac.uk

Background: Cascade of Care Data Communication Debate



Background: Snapshot of Tayside, Scotland

- Maintains **up-to-date records** on all HCV cases and treatment journeys, offering a robust dataset for evaluation
- **Prevention:** provides sterile injecting equipment, opioid substitution therapy, risk reduction education, and destigmatisation
- **Testing:** 9 pathways
- **Treatment:** 5 pathways (Outreach, Pharmacy, Hospital, Prison, & IEPS)
 - Direct Acting Antivirals (DAAs) available to all that clinically require it



Methodology: Producing Outputs

- Variables like PCR Positive test dates, past medical histories, DAAs treatment start dates and statuses, cure dates, and death dates were analysed to create a **coding framework**
- The framework was used to code each patient's Diagnosis, Treatment, and Cure status each year to produce a **stacked clustered bar chart** and **cumulative line graph**

Model Stacked Clustered Bar Chart

- Overview of epidemic progression
- Conversion rates year-on-year
 - Tayside's Diagnosis to Cure rate increased from 15.36% (2015) to 43.77% (2018)
- Detail within each stage of the Cascade
 - The portion of Diagnosed cases that cannot progress for clinical reasons
 - The portion of New vs Previously Diagnosed that start treatment each year
 - 34.31% of Newly Diagnosed cases and 24.94% of Previously Diagnosed cases begin treatment each year in Tayside
 - The portion of Treated cases that do not progress to Cure
 - Death rates at each stage
 - Tayside death rates dropped from 4.1% to 2.3% between 2015 and 2019

